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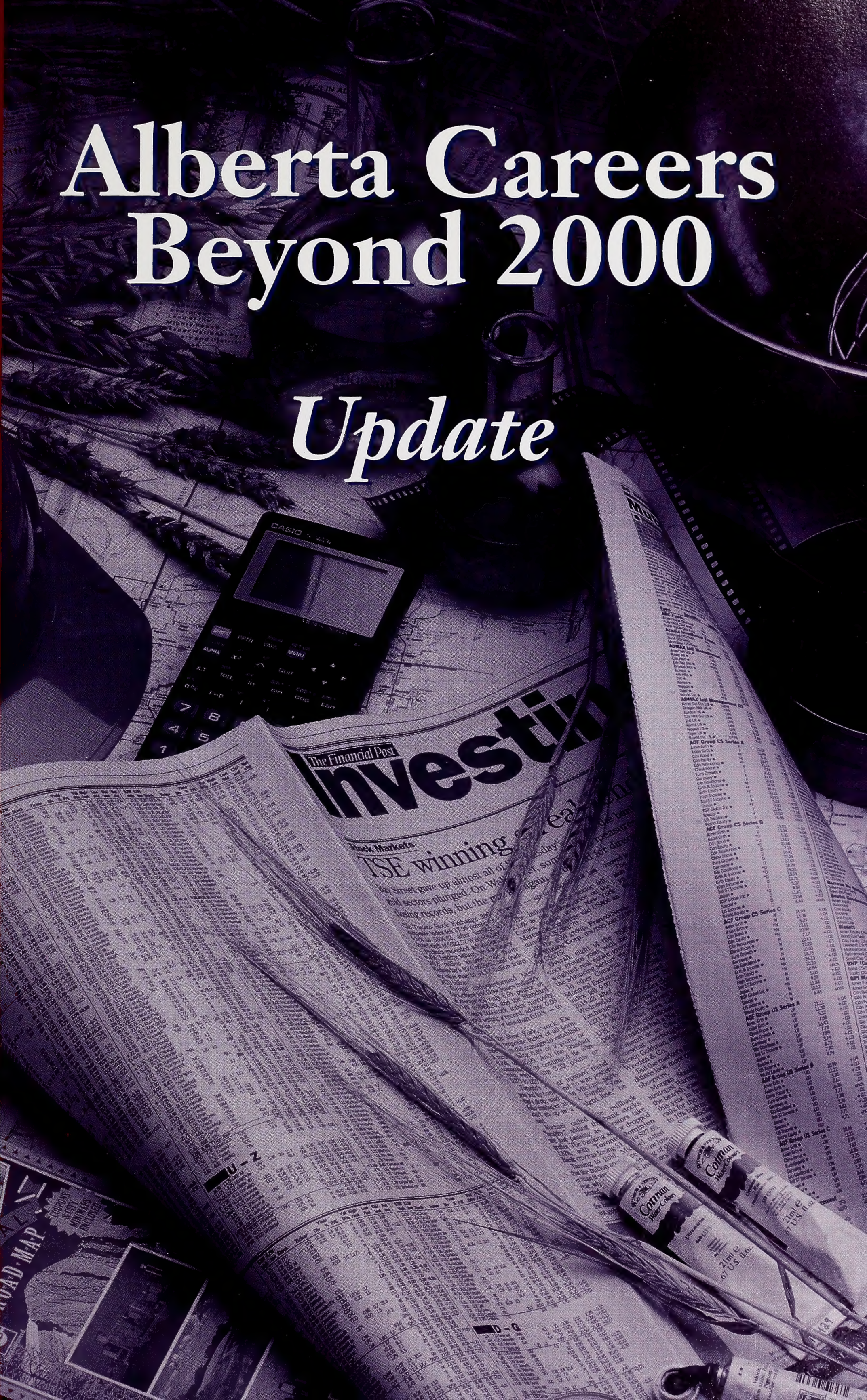
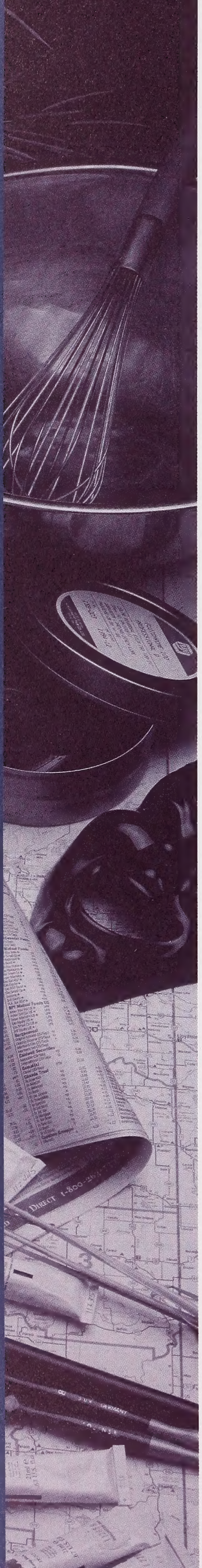
Alberta Careers Beyond 2000

Update



Alberta
HUMAN RESOURCES
AND EMPLOYMENT



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Fax (780) 422-5319
E-mail info@alis.gov.ab.ca

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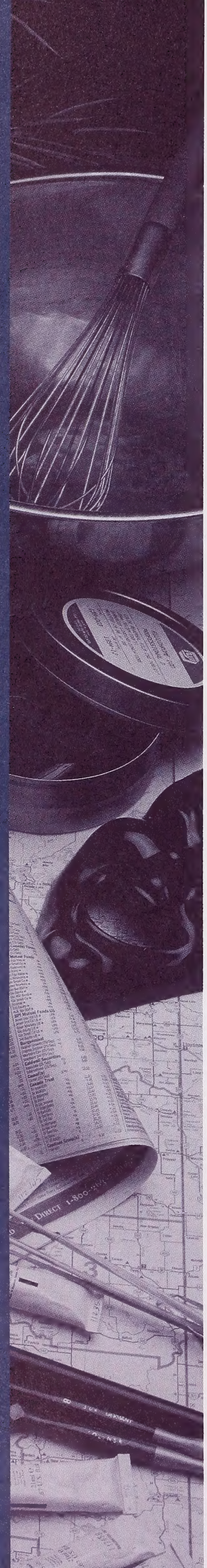


Foreword

Over the years leading to this new century, you've been hearing about "globalization" and the "new economy," corporate "downsizing," and "economic diversification." You've also listened to people try to predict the future and use terms such as "knowledge industries," "high tech," "E-commerce" and "outsourcing."

These are interesting - even exciting - words and ideas. But what does it all mean to you as an Albertan? What do you need to know to make the career and training choices that are right for you? What opportunities will be there for you, your children and your grandchildren beyond 2000?

This publication is a summary of the major findings of a 1999 report by Dr. Roger J. Goodman, President of Kernow Enterprises Inc. in Calgary, Alberta. Kernow Enterprises specializes in business trends seminars and studies. Alberta Human Resources and Employment hired Dr. Goodman to review and update his research on the main forces of change and how they will affect the Alberta workplace through 2010. Roger Goodman's credentials reflect an insightful knowledge of science, engineering and business economics. He holds a Doctor degree of Philosophy from the University of Oxford, Bachelor of Science degrees from the University of Wales and a Bachelor of Arts from Carleton University.

Alberta Careers Beyond 2000 Update is a follow up to the 1996 document ***Alberta Careers Beyond 2000***, and is based on the updated material produced by Dr. Goodman. This report presents an analysis of key economic, social and demographic, technological, and workplace trends. It also presents a detailed review of 23 industry sectors using information from a variety of sources including representatives of Alberta industry. Dr. Goodman has provided estimates of industrial growth for the next ten years; that is, up to the year 2010.

The trends analysis and the industry review have been used as the basis for arriving at a series of projections of future demand for over 400 specific occupational clusters. These projections have been used to describe general employment trends and expected demand for larger occupational groups. Dr. Goodman has provided estimates of occupational growth for the next five years; that is, up to the year 2005. Occupational growth estimates are limited to five years because there are many factors that can affect the growth of specific occupations and it is virtually impossible to predict how those factors may change over a longer period of time.

The occupational trends described in Part 3 have been compiled by using Dr. Goodman's industry outlooks and an "econometric" model known as the Canadian Occupational Projection System (COPS).

Since occupational outlooks are affected by a variety of factors and will change over time, readers are encouraged to look for additional information to help them in their career and educational planning.

In this report, Roger Goodman provides *his* views and analysis on future trends. These are not necessarily the views of the Alberta government.

How to Use this Publication

This publication is divided into three main parts. It is organized so that you can choose as much or as little as you would like to read. You may read all three parts together and in order or you may choose to read only the part or parts you find most interesting.

The three main parts are as follows:

Part 1 - Economics, Change and the Evolving World of Work

If you want to know more about economic, social, demographic, technological, environmental and other factors that affect opportunities for work, then read Part 1.

Part 2 - Outlook for Alberta's Major Industries 2000-2010

If you want to know more about the kinds of industries that operate in Alberta and how well they are expected to perform over the next ten years, then read Part 2.

Part 3 - Occupational Outlooks 2000 - 2005

If you want to know what occupations are expected to be in future demand over the next five years, then read Part 3.

Part 1 and Part 2 provide detailed background information. They help the reader understand the basis of the occupational projections presented in Part 3.

Some readers may be interested in only the key findings for specific occupational clusters found in Part 3. In fact, this information makes up a large portion of this publication. Please feel free to skip directly to Part 3.

Introduction

How Can We Predict the Unpredictable?

Work and occupations are not created out of thin air. Work is created out of necessity, because a certain task or set of tasks needs doing. Over time, the demand for various occupations is modified, expanded, or even contracted due to the forces of change. New technologies, industrial growth, changes in the work force, world economics, the spending habits of families – all of these affect the number and type of occupations required in a given location and time.

One hundred years ago people worked in occupations that no longer exist today. How many of us are working as blacksmiths? Stagecoach drivers? Telegraph operators? These occupations were vital to the Alberta of 100 years ago. They helped the economy prosper, fostered progress and enabled people to build a life for themselves and their families. These occupations have disappeared because the world that employed people in those occupations changed. In another 100 years, people will be doing work we can only dream about.

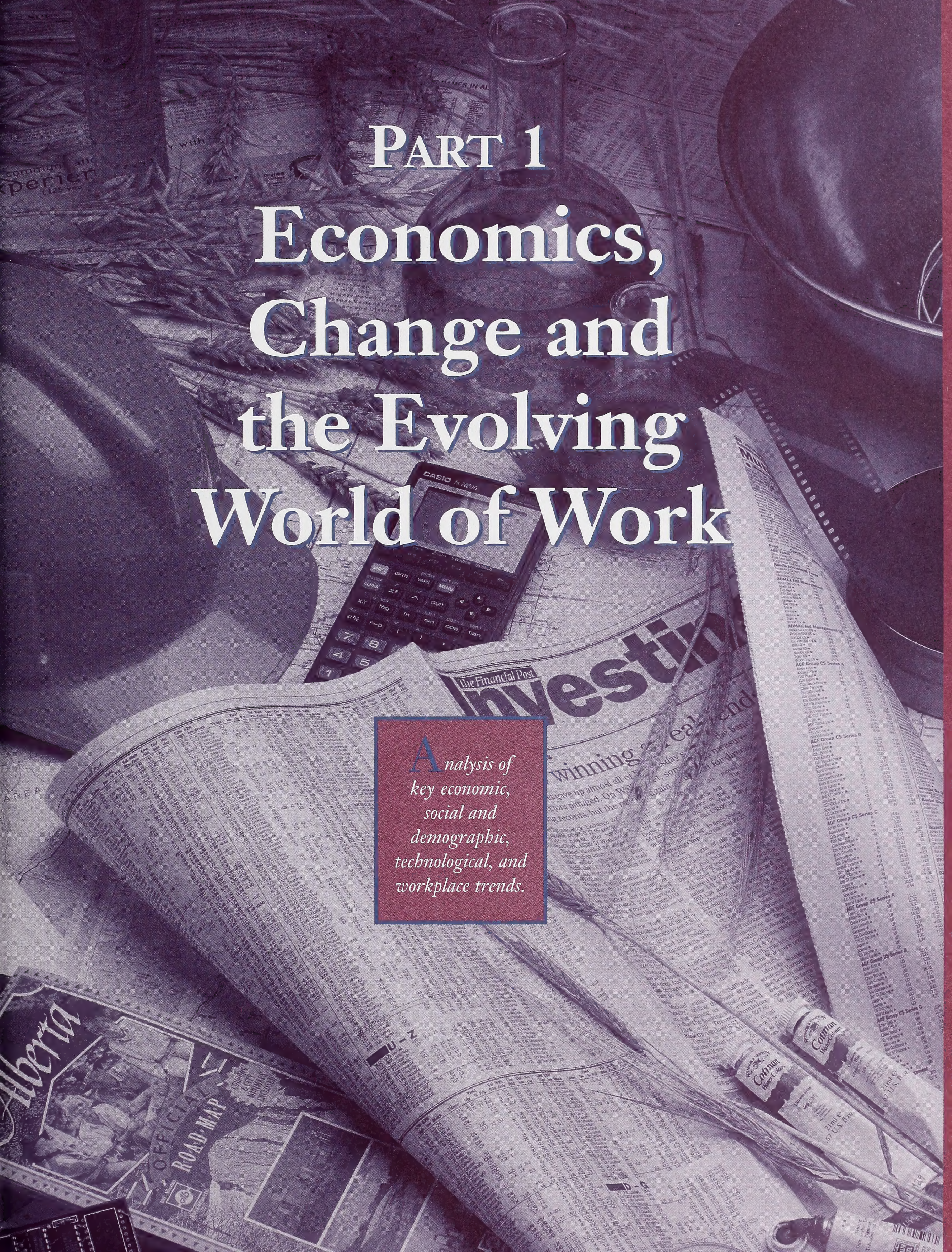
But what about the next five years? Where will the demand be then? It is impossible to predict exactly what occupations will be in the most demand, even in the relatively near future. But, by studying the things that affect demand for occupations, it is possible to come up with some pretty good educated estimates. What Alberta industries are growing? What industries are shrinking? How is technology changing the way work is done? What about our aging population? What is happening in our workplaces? What's happening in the rest of the world?

What are the economic, social, demographic, technological, workplace and industry trends that affect occupational growth in Alberta?

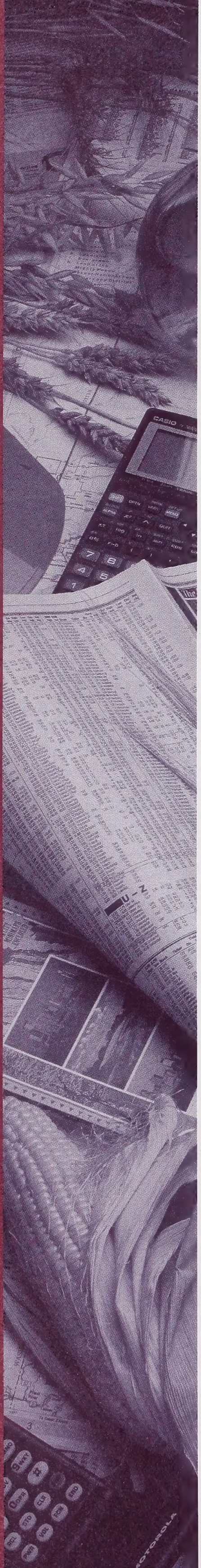
By looking at all of these things and more, we can begin to see what occupations are likely to be in demand.

PART 1

Economics, Change and the Evolving World of Work



Analysis of key economic, social and demographic, technological, and workplace trends.



Alberta in a Global Economy

Alberta's economy does not operate in isolation. It is influenced by events in other parts of Canada, the United States and the world in general. Alberta also has its own advantages and characteristics that make its economic situation unique. Together, these economic factors can have a significant impact on the availability of work opportunities. This section looks briefly at some recent trends in the global and Alberta economies.

Trends in the Global Economy

In terms of commercial reach, the world is getting smaller. Information technology has broken down barriers and created global markets for local goods and services. E-commerce (electronic commerce), especially over the Internet, has grown in leaps and bounds. New trade partnerships are being formed to create new opportunities for doing business. As we enter the new century, the global economy appears to have the following characteristics:

- It is a highly competitive trading arena that focuses on innovation, flexibility, speed, productivity, and easy movement of people, information and capital.
- There is increased deregulation and privatization of industry in developed and developing worlds.
- Information technology is a dominant force that allows instantaneous flows of information and creates new connections.
- Multi-national companies are more able to move from one part of the world to another.
- World trade in goods and services will become more open within a framework of larger regional trading blocs.
- The three key areas for world economic activity will remain the United States, the European Community and the Asia Pacific region.

Trends in the Alberta Economy

Over the next ten years, the Alberta economy will likely be the strongest in all of Canada. Alberta is also viewed as a good place to do business. Factors that contribute to this success include:

- **Predictable and stable government policies.** The Alberta government has successfully promoted the "Alberta Advantage," which encourages private sector initiatives, privatization and deregulation within a favourable fiscal environment.
- **Alberta's fiscal environment.** Alberta has the lowest overall taxes in Canada, no net government debt and an ongoing budget surplus. This puts Alberta in a good position to deal with demands in areas such as health, education and infrastructure.
- **A diversified economy.** Alberta is less dependent on energy than in the past and has moved into a wider range of industries including forestry, furniture, electronic products, machinery, petrochemicals, and transportation equipment. Business services, personal services, tourism, and retail and wholesale trade

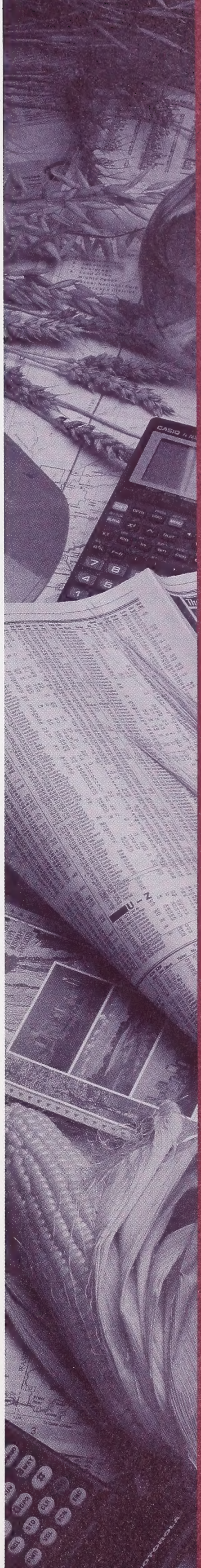
have also shown strong growth. As well, the high technology sector will become a more important part of the economy.

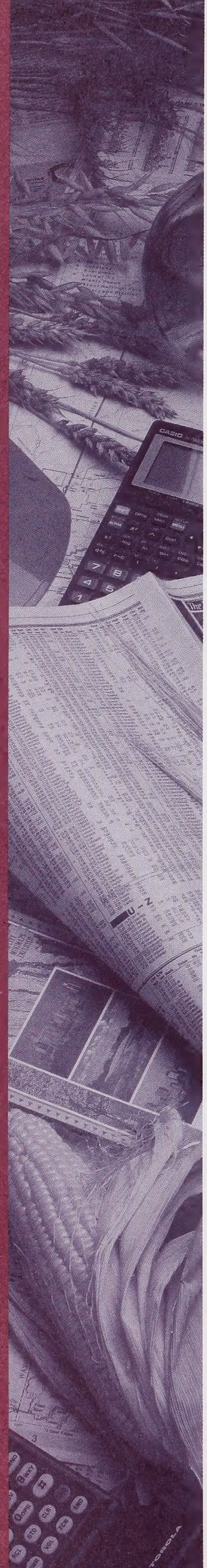
- **A strong work ethic and educated work force.** Alberta's labour force appears to thrive on change and exploring new ideas. This will serve Albertans well in the new "global economy" where it is important to be flexible, adaptable and creative. Alberta seems to foster an entrepreneurial spirit in its workers. Alberta also has a higher percentage of people with post-secondary education than most of the other provinces and territories.

Future Challenges for the Alberta Economy

While Alberta's economic future looks bright, there are a number of things that remain uncertain:

- **The Asia Pacific economies have not yet fully recovered.** The recent economic crisis in countries like Japan, Hong Kong, Indonesia, Malaysia, Thailand, Singapore and South Korea has had a serious impact on the global economy. These economies will recover from their recessions but the question remains when? The Asia Pacific economies affect Alberta very directly in terms of markets for forest products, petrochemicals and agricultural products.
- **Oil prices continue to be unpredictable.** While oil and gas are not as dominant in the Alberta economy today as they were 20 years ago, prices affect government revenue from royalties. Oil and natural gas also generate economic activity in other industries such as manufacturing and construction.
- **The future value of the Canadian dollar is uncertain.** The Canadian dollar is still well below the U.S. dollar. The value of the dollar is critical to the health of many of Alberta's export sectors.
- **Future price levels are uncertain.** There has been very little inflation in recent years. Most economists believe we are in a period of price stability. But some are worried that this may lead to an unhealthy period of either deflation or growing inflation.
- **Alberta's economy has shifted structurally.** Alberta's economy has diversified and is now dependent on a variety of industries, not just oil and gas. However, contrary to earlier predictions, growth in service industries has not been as high as expected in recent years. Rather, there has been strong growth in areas such as manufacturing and forest products. As well, there have been reductions in the public service, health and education. While we can expect these service sectors to rebound, overall future growth patterns are uncertain. The best assessment is that there will be growth over a variety of industries rather than in any single industry or sector.





Forces of Change: Recent Trends

As we discussed, Alberta is not alone in the world. Economic events on the other side of the globe can influence our industries. There are a variety of other factors that also shape our economy. In this section, we will look at some of the forces of change that are a part of how we work and live.

- Social and Demographic Trends
- Technological Trends
- Environmental Trends

Social and Demographic Trends

Social and demographic changes affect Alberta's economy. This in turn affects the demand for occupations. Some recent social and demographic trends in Alberta include:

- **Changing household types.** There are now fewer traditional nuclear families with two parents and children than there were in the last century. There are also more different types of households, including single parent families and "blended" families with step parents and step children living in the same household. More young people are living with their parents longer, largely for economic reasons.
  Economic implications: These changes have sparked new economic activity including strong growth in condominiums, migration to the inner city, gated communities and repackaging of consumer products for smaller households.
- **An aging population.** Alberta has a relatively young population, but it is aging quite rapidly. There are now large numbers of baby boomers moving into their mid-50s. In Alberta in 1999 there were 609,569 people between the ages of 45 and 64. This represents just over 20 per cent of the Alberta population as a whole.
  Economic implications: This has major implications for housing, financial services, tourism, accommodation, and the food and beverage industries. With more money at their disposal, aging baby boomers will create demand for second, often recreational properties, financial services, and tourism, including "soft" adventure. "Soft" adventure usually includes less physically challenging but equally exciting activities such as educational trips and eco-tourism. Eldercare will also become more important. Health care demands will increase significantly.
- **Continuing migration into Alberta.** Alberta's strong economy has drawn people from other provinces and countries. This has put a strain on many public services especially at a time of fiscal constraint by all levels of government.
  Economic implications: This will create a growing need for strong re-investment in many public services especially health care and education. There will also be investment in other areas of infrastructure. For instance, there are plans to expand road and light rail transit systems to meet increased demand in Alberta's two major centres.

- **Two income families.** Due to the hurried lifestyle of the two-income family, time is even more precious. Balancing time at work and time with family and friends is a major challenge of modern society.
  Economic implications: This can lead to growth in personal services, the food and beverage preparation and delivery industry, leisure activities, childcare and elder care.

Technological Trends

Technology is the great enabler of progress and a key driver of social change. Since before the industrial revolution, advances in technology have reshaped the work world. Technology has always been a double-edged sword. On the one hand, it creates entirely new jobs. On the other, technology can cause entire groups of jobs and work to disappear. Many occupations exist today that would not have been even conceived of ten years ago. For example, there is now work in multi-media, laser entertainment, and web page design – the list is endless.

The latest wave of new technology is "knowledge-intensive." It includes computers, telecommunications, robotics, laser technology, bio-technology, advanced materials and new power systems such as fuel cells. These technologies are leading to the "miniaturization" of products or put more simply, things are getting smaller. Technology also increases productivity, lowers costs and gives consumers more choice.

Technology does not always displace existing systems. In fact, different systems can co-exist for long periods of time. For example, print media is still very active despite the tremendous growth in electronic media – people still like reading books and newspapers made of paper. Technology will provide greater choice, flexibility and the ability to customize products to suit individual needs.

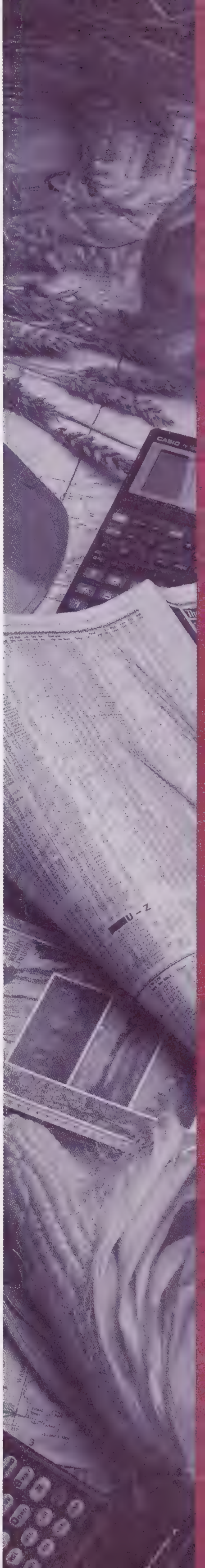
The next sections take a look at trends in three areas of technology:

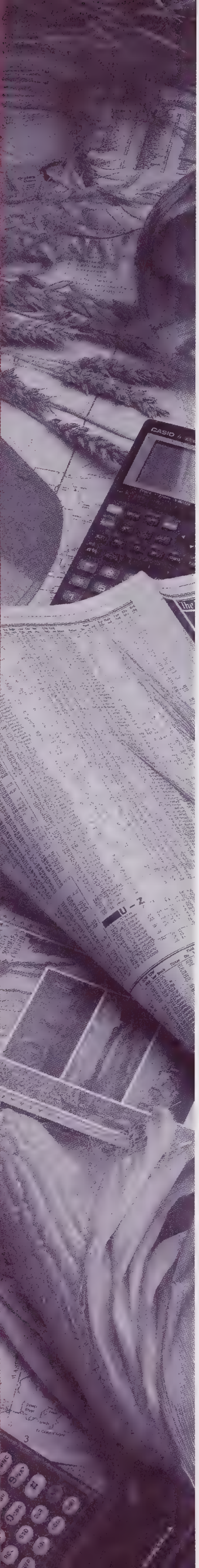
- Information Technology
- Biotechnology
- Materials Science

Information Technology

This technology is truly revolutionary. It has penetrated every part of our lives. There are three major ways in which information technology affects society.

- **Universality.** Information technology has changed virtually every segment of economic activity. Three-dimensional (3D) seismic programs have made it easier to find oil and gas. Computer-assisted design (CAD) in manufacturing has helped bring new models of cars to market faster. Information technology has revolutionized the office environment through advanced software programs, Internet access, scanners and multi-media equipment for presentations.
- **Miniaturization of products.** Remember when a computer used to take up an entire room? The silicon chip has shrunk our world. Digital technology has reduced the size of computers, cellular telephones, calculators, cameras, hearing aids and many other electronic devices.
- **More customer choice.** More than anything, information technology has given customers much more choice in products and services, and a higher degree of customization. They can shop at a mall or through the Internet. They can go to a teller or bank on-line. They can take courses through satellite hook-ups or in





regular classrooms. Consumers can also choose from a seemingly endless array of electronics products.

Information technology is making time and location less important. It is blurring the lines among business, home and leisure. Today, there are more than 400 million personal computers in the world. They are used in stores, offices, kitchens, movie theatres, hospitals and even places of worship. Yet, some think that information technology today is still in its infancy. They believe that the best is yet to come.

Other key trends in information technology:

- **Consumers do not always use information technology to its full potential.** For example, in theory, all newspapers could now be delivered on the Internet. But many people still prefer the paper version to the computer version. Information technology also has given us very powerful means of collecting and distributing information. However, it has done little to help sort out what information is useful, relevant and credible and what is not. This is particularly so with the Internet.
- **Advances in information technology will continue at a frenetic pace.** There will be more breakthroughs in silicon chip design and fabrication. Voice-activated systems will soon be commercialized on a massive scale. Other devices are also nearing commercialization including smart cards, smart phones and handheld wireless communications devices.
- **Electronic commerce (E-commerce) is in its early stages and still focuses mainly on Internet retailing activities.** The large untapped market is business-to-business E- commerce, which is expected to grow exponentially over the next five years. E-commerce will revolutionize areas such as procurement, shipping and sales.
- **The Internet is beginning to have a significant impact on the world of shopping.** The amazing development of Amazon.com (a cyberspace bookstore) is viewed as the tip of the iceberg. This multi-billion dollar business is at the cutting edge of Internet retailing, and it has all happened in two years. Some analysts predict that as much as 15-20 per cent of all retail activity could be through the Internet by 2001-2002. For people who find conventional shopping a chore, the Internet will be a welcome alternative. Others, however, will prefer actual shopping. Ultimately, the battle between Internet retailing and conventional retailing will be about the total shopping experience. Expect entertainment, leisure and other activities to be added to traditional shopping. Expect Internet retailers to include technological elements such as 3-D “virtual” shopping where customers can “try things on” from the comfort of their own homes.
- **Mobility of products is opening up new choices for the consumer.** Products will continue to get smaller and more portable. Voice, data and word processing devices will be more integrated. They will build in seamless connections to office networks.

These developments will all eventually lead to the “virtualization” of society. “Virtual” offices are already a reality for some and virtual corporations are emerging. “Virtual” corporations will be unified networks and operate 24-hours a day. They will be high performers who are also flexible, mobile, and decentralized. Location will not matter. Such organizations will be able to move around people, money and capital at break neck speed.

Biotechnology

Biotechnology in Alberta appears to be on the brink of rapid development and major commercialization.

Biotechnology is about using technology and biology together to provide food, chemicals and services to meet the needs of humans. This definition includes agriculture, horticulture and many other aspects of applied biology. One of the earliest examples of biotechnology is the fermentation of drinks. This process, used to make things like beer, stretches back to the beginning of recorded history. Another example is the use of yeast to make leavened bread.

Genetic engineering

In this report, when we talk about "biotechnology," we are talking about genetic engineering. We recognize that biotechnology includes several other processes and techniques. However, these will not be discussed here.

Genetic engineering involves modifying genetic material and has become a topic of much debate. The science is difficult and complex. However, the ethical issues are even more so. The next few years will be key in determining how far genetic engineering will go and how consumers will respond.

Genetic engineering has two major areas. The first is the isolation of useful genes from plant or animal cells and transferring them to microorganisms such as bacteria. The bacteria in turn serve as proliferation or manufacturing facilities. The second biotechnological process permits the transfer of useful genes from one plant, animal or microorganism to an unrelated species. The desirable trait will then become part of that species.

Genetic engineering, or for our purposes, "biotechnology" has been used extensively in agriculture. It also has been used in the health sector.

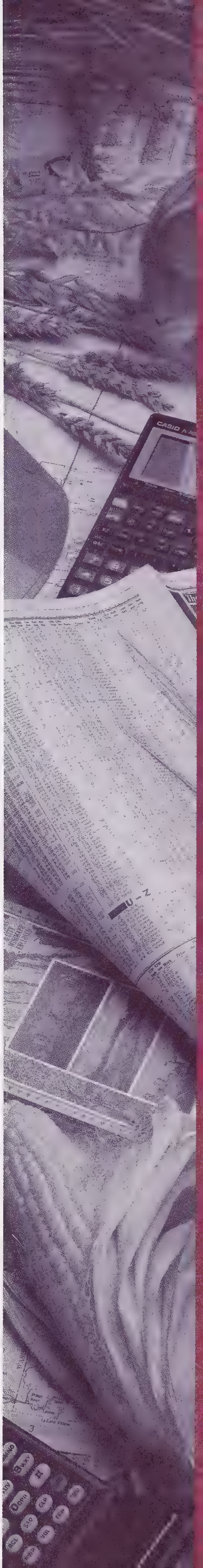
Biotechnology in agriculture

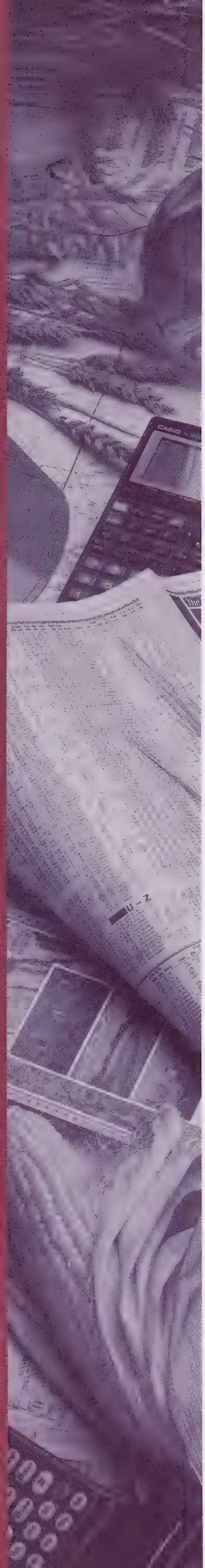
Biotechnology can greatly increase productivity in agriculture. Higher crop yields, better crop resistance to pests and pesticides, and greater milk and meat yields have been achieved through biotechnology.

The era of designer foods is fast approaching, as is the controversy. Canola is probably the largest crop grown in Canada to be genetically modified. This has been done to produce edible oil. The Monsanto company recently began marketing a genetically altered potato that is resistant to the destructive Colorado beetle. In addition, many North American farmers now grow canola, soybean, cotton and corn that are genetically resistant to a variety of herbicides and insect pests. Other crops are also close to being brought to market, including cereals that are genetically modified to withstand frost and drought.

Consumer concerns

Consumers are becoming more aware and better educated about genetically altered plants and livestock. It appears that many genetically modified materials do not have a harmful effect on health. However, some people remain concerned. For example, Health Canada has banned a growth hormone used to enhance milk yields in dairy cattle. Health Canada believes that this hormone, already approved in the United States, may lead to more infected udders in cattle. Generally speaking, there have not yet been strong objections to genetically modified foods in North America. This contrasts strongly with Europe where consumers have been actively trying to stop the introduction of genetically modified foods.





Biotechnology in health care

Biotechnology will also affect the health care sector, opening up new possibilities in the detection and treatment of human diseases. Biotechnology is having its biggest impact in medical diagnosis and drug therapy. Today few diseases are untreatable if detection is early enough. Gene or DNA-probes are being developed for primary and early diagnosis. Eventually many of these biotechnology techniques could become available in cheaper and more reliable home test-kits.

Biotechnology also offers the best potential for new "super-drugs." Today, there are very few drugs brought to market from biotechnology. However, many drugs are now moving through the "pipeline" in long-term clinical trials. Many of these focus on cancer, heart disease and immune deficiency diseases. They could have a huge impact on lowering the health care costs associated with treating chronic and debilitating diseases. However, these drugs will be expensive in order to cover high research and development costs.

Materials Science

Today, synthetic materials with specific properties dominate the world of materials science. Such materials include polymers (plastics), composites, ceramics, fibre optics and new high temperature super conducting materials. While the price of new materials is important, performance can be even more so. The ratio of price to performance often determines whether a modern material can be brought to market successfully. High performance materials can support higher prices.

Competition among material producers is increasing. Steel, metals, forest products and plastics are being overproduced globally. Plastics, composites and ceramics appear to have good prospects for growth. However, they will still face strong competition from steel, aluminium, other metal alloys and wood.

New technology is helping to produce ultra-lightweight steels for use in goods like automobiles. In fact, the automobile will become a prime battleground for materials makers. Plastics and aluminums manufacturers will try to displace steel. More producers could focus on energy conservation and energy efficiency due to the 1997 climate treaty reached in Kyoto, Japan. The treaty requires that greenhouse gas emissions of Canada and other industrialized nations be below 1990 levels by 2008-2012. This would require a substantial reduction in the volume of emissions currently produced. The automobile may also become a prime target for enhanced energy efficiency. Using lighter materials in cars could help achieve that efficiency.

Over the next ten years, materials science could hold the key to breakthroughs in areas such as fuel cells, transmission lines, battery technology, power storage systems and engine design. The price-performance ratio will have a major role in deciding the winners in each area of materials production.

Environmental Trends

Environmental issues are becoming a bigger part of economic decision-making. Alberta has some unique challenges, particularly in sensitive areas such as the mountain and foothills terrains. There could be conflict among the various economic activities in these areas. Such activities include ranching, forestry, mining, oil and gas development, and tourism. In addition, concern about global warming and waste management will impact Alberta.

Global warming

Alberta is a major producer of all the fossil fuels. This poses a major challenge in terms of global warming. Some scientists believe that our planet is gradually warming because of the production of human-made "greenhouse" gas emissions. The emissions are mainly carbon dioxide from cars, factories and power plants.

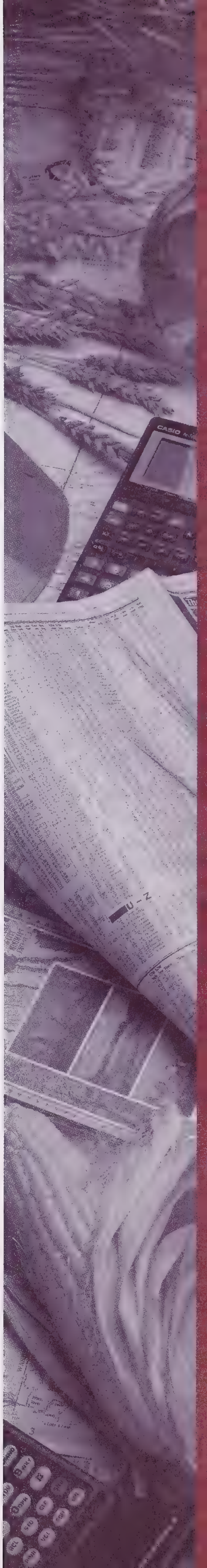
Alberta's global warming challenge is made worse by the fact that we depend almost totally (about 90 per cent) on coal for power generation. In addition, future oil development will tend to favour the extraction of heavy oil and bitumen. Bitumen has relatively high emissions of carbon dioxide. Solutions may include effective emissions trading programs, environmental offsets or even selective carbon dioxide recovery programs. There is no question that Alberta will feel the impact of global warming policies far more severely than any other province. We are not only a domestic producer of oil, gas and coal, we also export large amounts of these resources to other provinces, to the U.S. and to international markets.

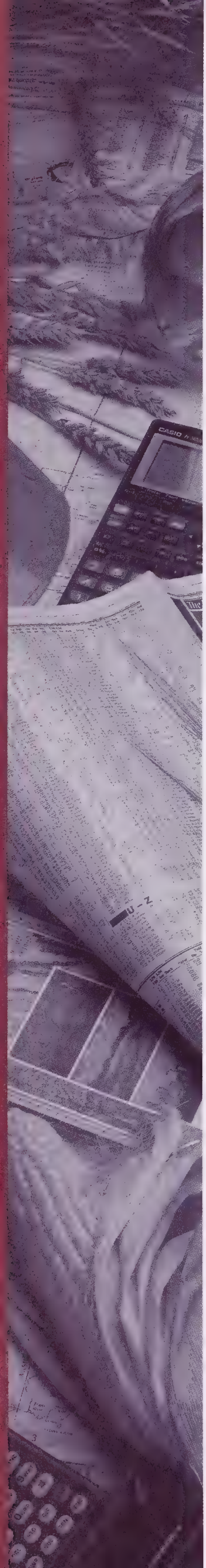
Many question the science of global warming. Despite a lot of circumstantial evidence, the actual science of greenhouse gas emissions and the carbon cycle is complex. However, we have now moved past scientific debates right into applying policy. The 1997 climate treaty reached in Kyoto, Japan would require that Canada and other industrialized countries reduce greenhouse gas emissions to below 1990 levels by 2008-2012. In most developed countries, we cannot meet those targets without dramatic changes to our lifestyles. This is unlikely to happen. But it may be also naïve to think that we will not seriously try to reduce greenhouse gas emissions after 2000. Rather than a big lifestyle change, there may be more focus on "softer" options such as energy conservation and efficiency, and fuel switching. For example, most future power plants in Alberta will likely be combined cycle gas turbines (CCGT) instead of coal-fired boilers.

Waste management

Environmental awareness will lead to growth in residential and commercial waste management. The "4Rs" – reuse, reduce, recover and recycle will continue to be cost effective and responsible ways to handle waste disposal. New technologies will be developed to recycle plastics into more usable products. If energy conservation and efficiency programs grow in response to global warming, waste management and recovery programs will likely grow as well.

Opportunities will grow in oilfield waste management and water treatment. There will be more applications of ultra-violet and membrane technologies in the treatment of drinking water.





The Evolving World of Work

A Jobless Future?

There has been a great deal of speculation about a jobless future. According to some, information technology and automation will whittle away at jobs till eventually there are none left. This type of discussion is hardly new. Similar views were expressed at the beginning of the last century when the industrial revolution was still in its infancy. Many studies show that there is little substance to these predictions of a jobless future. Rather, job and workplace change and turmoil are constant over time.

New technologies can create new job opportunities in one area and destroy them in another. Economic trends have the same effect. The future of jobs such as bank tellers, clerical workers and plant operators may not be bright. However, there is a whole host of new jobs being created in information technology, including software developers, network specialists, and web page designers. New jobs are also being created in health care, tourism, training, financial advisory services and business services.

Yes, the future workplace will be more challenging but there is little evidence that it will be jobless or without work opportunities. However, one cannot ignore the fact that people with skills that are now less in demand will need to adapt to this changing workplace.

Forces Affecting the Workplace

The workplace of the future will be very different for a variety of reasons, including:

- Globalization and increasing competition
- Information technology
- The blurring of workplace locations
- Employers expecting more of their employees

Globalization and increasing competition

Information technology has shrunk the world. The global village is now reality with all economies tightly linked and integrated into a worldwide economic and trading community. Communication goes on 24 hours a day in a highly competitive, multi-media environment. Commerce never stops.

Trade among nations continues to grow faster than the world economy in general. The world is becoming a giant network of nations, organizations, companies and workers. “Virtual” teams are also part of this evolution. The end result is a very dynamic, flexible, ever-changing work environment. “Virtual” organizations use technology to shrink distance and exchange information almost instantaneously.

Information technology has made the global environment highly competitive. There is more access to information and clarity about prices. Consumers have more choice and can order specialized products and services from anywhere in the world. Companies can move people and capital around the globe more freely. New competitors are entering the race, sometimes in new forms, such as Internet retailing.

Information technology

Information technology has enabled a great deal of workplace change. Networked computers, teleconferencing, videoconferencing, cable, microwave and satellite communications all make the new economy work. An electronic environment has made location almost irrelevant. It has given everyone the opportunity to share in global business activity. Today, small business owners who want to compete in the global marketplace are not necessarily at a disadvantage to the multi-national corporations.

Multi-media – a unified system of voice, data, imaging and text – are rapidly evolving. These technologies offer many options for marketing, learning, training and communications. Information technology also allows business to integrate production, distribution and marketing systems. The growth of information technology also means that employees must have different skills.

The blurring of workplace location

As we've discussed, information technology has been largely responsible for making location unimportant to many types of work. Information technology has also led to explosive growth in distance learning and Internet instruction. Home-based businesses and the "officeless" worker are becoming commonplace. For the true corporate "gypsy" there is no permanent office, the office is wherever the client is – the airplane, on the other end of a cell phone, or at home.

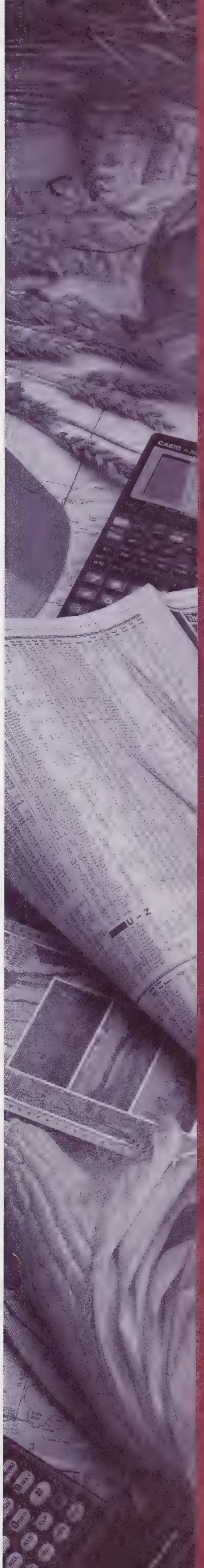
It would be incorrect, however, to assume that the conventional office environment is going to disappear and everyone will retreat to a home office. Information technology involves people and the interaction of those people. For many, this means personal interaction is the main way to communicate and work. The shift to team environments makes this even more critical. The isolated nature of a home has already driven some people back to the office. Eventually, the norm may be the mixed environment where many people spend two to three days at home and two to three days in the office – maybe the best of both worlds. The key issue is personal choice. Today, information technology permits that choice for many people.

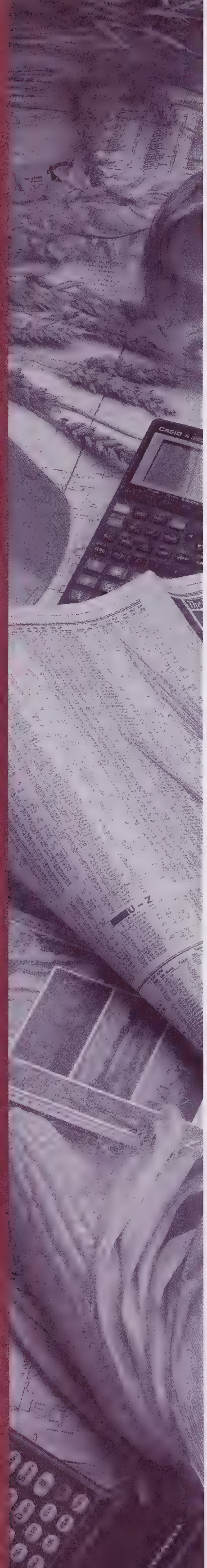
Employers expecting more of their employees

Changes in the world of work have led employers to expect more from their employees. Technical competence in one's discipline or job may not be enough. Business, information technology and interpersonal relationship skills are becoming more important. Lifelong learning and skills upgrading - once for the select few - are now for the majority.

The "virtual team" and network concept places new demands on its people. Entrepreneurs have long been defined as independent, self-motivated leaders. Now, workers in larger organizations must acquire similar traits. This is a major shift from the past when organizations focused on a "pigeonhole" approach to work. This was characterized by well-defined roles and responsibilities, and strong dependence on the structure and rules of the hierarchy. Virtual teams are more focused on performance and outcomes, creating shared values, speed, and highly decentralized functions.

Increasingly, workers will require a balance of knowledge and skills that continually evolves over time. Reward systems will focus on pay-for-performance. Individuals will be more responsible for managing their own benefits and pensions.





The Characteristics of 21st Century Workers

Clearly, there are many forces acting upon the workplace and therefore the worker. To be successful, workers will need to possess the following characteristics. These are not listed in any particular order:

- High levels of initiative and imagination
- High degrees of flexibility
- Focus on innovation and creative solutions to problems
- Increased accountability
- Computer and communications literacy
- Sound business insight
- Constantly questioning mind
- Entrepreneurial nature

They will also need to be:

- Multifunctional
- Willing to learn, to constantly upgrade skill sets
- Good communicators
- Team players

The Characteristics of the 21st Century Workplace

The agents of change discussed so far have had and will continue to have a profound impact on the workplace. Expect the workplace of the 21st Century to have the following characteristics. These are not listed in any particular order:

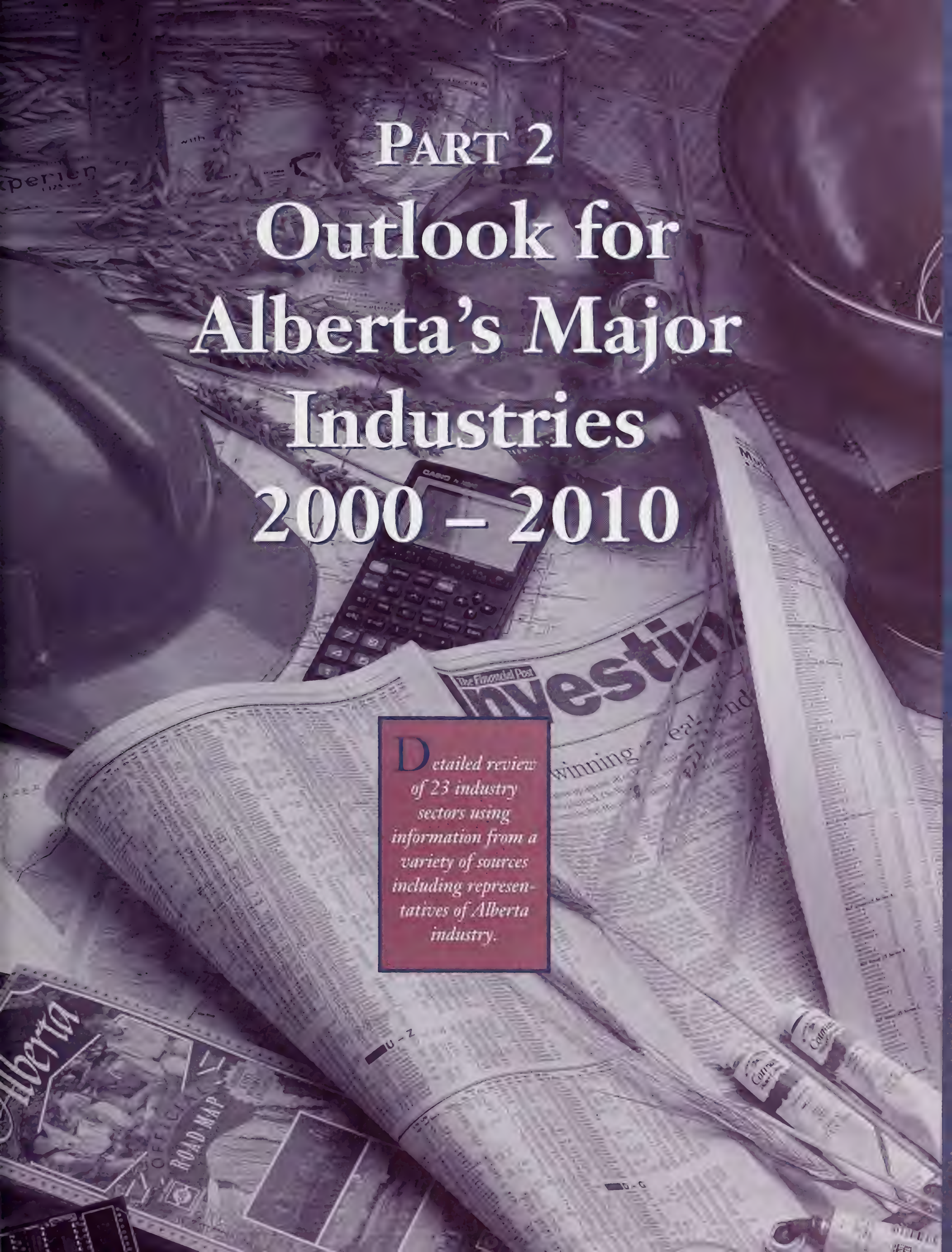
- Focus on flexibility
- Focus on knowledge management and enhancement
- More sophisticated technology
- Focus on customer service
- Enhanced competition
- Lifelong learning and continuous improvement of employees
- Team focus
- Increasing emphasis on pay-for-performance
- Independent, innovative and accountable staff
- More entrepreneurial focus
- Emphasis on customizing goods and services
- More flexible work patterns – telecommuting, job sharing, part-time work and combo-jobs
- Continuing experimentation with new and more effective workplace structures

Part 1 of ***Alberta Careers Beyond 2000 Update*** has briefly discussed economic, social and demographic, technological, and environmental trends, and the evolving world of work. In Part 2 we will take a look at what is happening within Alberta's major industries. Industrial activity has a huge impact on occupational demand and growth. For each of Alberta's 23 key industries we have provided information on the industry in general, as well as projected growth over the next ten years.

PART 2

Outlook for Alberta's Major Industries 2000 – 2010

Detailed review of 23 industry sectors using information from a variety of sources including representatives of Alberta industry.



Overall Growth

We have looked at the Alberta and global economies. We also have looked at the forces of change that affect the world in which we live and work. Before we can predict what occupations are likely to be in future demand, we must also understand what is going on within Alberta's key industries. These industries are affected by all the things we have discussed so far:

- Trends in the global economy
- Trends in the Alberta economy
- Social and demographic trends
- Technological trends
- Environmental trends
- Workplace trends

Industry can also affect these trends. The relationship goes back and forth. Whatever the reason, when some industries grow or change, jobs can be created in those industries. When other industries shrink or change, jobs can disappear.

Generally speaking, the future will be a continuation of recent Alberta experiences. The economy will continue to grow in a wide range of industries. In other words, the economy will keep diversifying. Much of our economic strength appears to lay in growth in resource industries - especially oil and gas development, and in manufacturing - especially petrochemicals, electronic processing, food processing and machinery production. Services are also expected to strengthen the overall economy. Strong growth is expected in business services, high technology services, construction, tourism, health care, food services and personal services. The strength of each of these industries bodes well for Alberta's overall economy. It also indicates how well each industry will be able to bounce back from changing economic conditions.

Growth Rates by Industrial Sector

Following are overall growth projections for the 23 major industry groups covered in Dr. Goodman's industry analysis. Industrial sectors are clustered into three major categories, each representing a projected annual growth rate over the next ten years. The three categories are:

- High Growth Sectors (3 per cent or higher annual growth)
- Moderate Growth Sectors (2.0 – 2.9 per cent annual growth)
- Slow Growth Sectors (less than 2.0 per cent annual growth)

High Growth Sectors (3 per cent or higher annual growth over ten years)

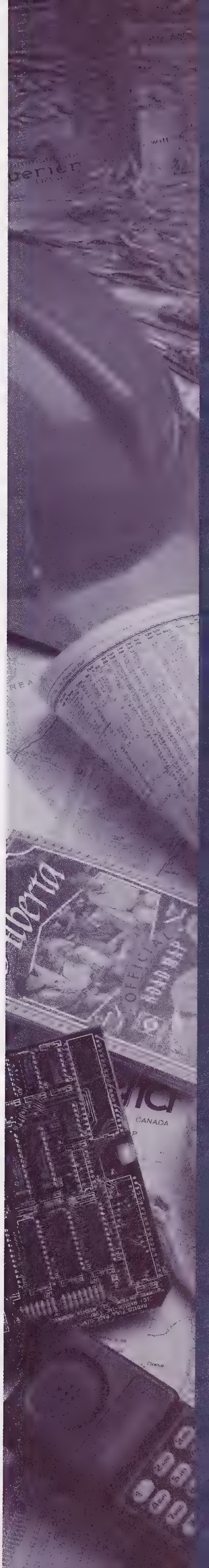
- Construction
- Crude Oil
- Food Processing
- Forest Products
- Metals Fabrication
- Natural Gas
- Petrochemicals
- Business Services
- Health Care
- Information Technology
- Miscellaneous Services
- Tourism

Moderate Growth Sectors (2.0 – 2.9 per cent annual growth over ten years)

- Agriculture
- Printing and Publishing
- Education
- Finance, Insurance and Real Estate
- Trucking
- Retail Trade
- Wholesale Trade

Slow Growth Sectors (less than 2 per cent annual growth over ten years)

- Agricultural Chemicals (Fertilizers)
- Coal
- Electric and Natural Gas Utilities
- Government Services
- Rail Transportation



Goods Producing Industries

We have just looked at overall growth rates for Alberta's key industries. The following section presents a more detailed overview and outlook for each of these goods producing industries:

- Agriculture
- Agricultural Chemicals (Fertilizers)
- Coal
- Construction
- Crude Oil
- Electric and Natural Gas Utilities
- Food Processing
- Forest Products
- Metals Fabrication
- Natural Gas
- Petrochemicals
- Printing and Publishing

Agriculture

Overview

Agriculture includes crop production, livestock production, mixed farming and support services for agriculture.

Agriculture employed about 80,000 people in Alberta in 1998.

Outlook

Agricultural production in Alberta will continue to emphasize more value-added production through food processing. There will also be more focus on exporting to the U.S. and Asia Pacific region. The industry will continue to diversify into alternate crops and livestock. Longer-term cereal production and canola production remain positive, even more so if Europe moves to reduce agricultural subsidies. Livestock production looks very promising, especially processing into beef and pork products. However, changing demographics, including an aging population and young people who eat less meat, are redefining food tastes in North America.

The industry will continue to increase productivity through new applications of biotechnology and information technology, and by making the grain elevator system more efficient. More processes will be automated as the industry seeks new ways to address the high cost of labour and labour shortages. Farms will get larger and family farms will look to other sources of income to supplement farm incomes.

Annually, the sector is expected to grow by about 2.0 per cent with employment growth of about 1.0 per cent.

Agricultural Chemicals (Fertilizers)

Overview

Agricultural chemicals - or fertilizers - are essential nutrients for crops. In Alberta, this sector focuses on the production of nitrogen and phosphate fertilizers.

The number of people employed in this industry is not large and there are no figures available.

Outlook

One company in Alberta, Agrium Inc., dominates the production of fertilizer. Fertilizer demand in North America is fairly stable. However, there may be some small increases in nitrogen-based fertilizer production. A new ammonia facility at Joffre may be in the works. Ammonium nitrate for explosive applications may also expand modestly.

The agricultural chemicals sector is a relatively mature industry in Alberta with future annual growth expected to be in the 1.0 -1.5 per cent range. Employment growth will probably be about 0.5 per cent annually.

Coal

Overview

Coal has two prime uses – one for generating steam for power production and the other for use in blast furnaces as a metallurgical reductant to convert iron ore to metallic iron, which is subsequently refined to crude steel. Alberta produces both metallurgical coal, which is primarily exported to Asia-Pacific, and thermal coal which is largely used for on-site power generation.

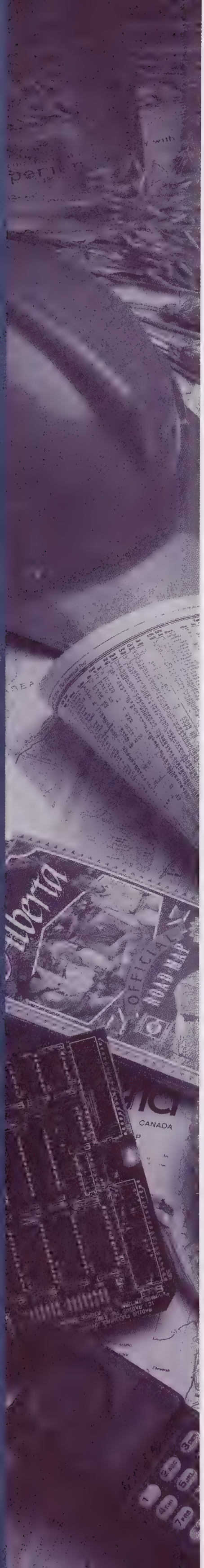
The coal mining and processing industry employed about 3,000 people in 1998.

Outlook

The biggest issue facing Alberta's coal industry is global warming. Some scientists have linked global warming to burning fossil fuels and the release of carbon dioxide into the atmosphere. Coal is the most carbon-rich of the major fossil fuels. Efforts to reduce the burning of fossil fuels and reduce global warming will affect Alberta's coal industry. Most new power generation in Alberta will be combined cycle gas turbine (CCGT) plants. However, most existing coal-fired boilers will likely remain in operation in the long term.

The outlook for export metallurgical and thermal coal looks bleak. In the short term, there will be an oversupply in global markets. A full economic recovery in the Asia-Pacific region will likely be necessary to bring the market back to a better balance between supply and demand. Alberta's smaller mines could be threatened in terms of demand for metallurgical and thermal coal. Mine closures are possible in the short term. Canadian mines tend to be high cost by world standards. Much of this is due to high transportation costs to distant markets in Asia and Europe.

The industry will likely shrink by about 1.0-2.0 per cent annually and employment will likely also drop by about 2.0 per cent annually.



Construction

Overview

The construction industry can be divided into three distinct sectors. The industrial or engineering sector that covers the building of dams, highways and pipelines, the commercial or business sector that includes hi rise buildings, shops and malls, and the residential sector that includes the building of homes and apartment blocks.

Alberta's construction industry employed about 115,000 people in 1998.

Outlook

Alberta's construction industry will grow in a variety of sectors. Mega-projects in the development of in-situ and mineable bitumen reserves will proceed. Power plant and petrochemical developments are also expected to move forward. Further industrial construction is forecast for the wood products, food processing, and pipeline industries. There will also be construction growth related to infrastructure projects such as road building and expansion of light rail transit systems. Strong growth in retail and wholesale activities will spur commercial construction including distribution infrastructure and warehousing. Strong growth in tourism will also support construction activity in the accommodation and leisure sectors. Residential construction will stay strong due to a variety of trends, including continuing inward migration and fragmentation of household types. Growth will also be supported by an active recreational and second home market as the baby boom generation ages.

Growth over the next ten years looks very promising with the sector expanding by about 4.0-4.5 per cent annually. Employment could grow by as much as 3.5-3.75 per cent annually.

Crude Oil

Overview

The crude oil industry consists of the exploration, development and processing of a variety of crude oils including light oil, heavy crude, bitumen, synthetic crude and natural gas liquids.

Alberta's oil and gas business employed about 68,000 people in 1998.

Outlook

Despite a brief dip in early 1999, the long-term outlook for the Alberta oil industry looks bright. The industry will start relying more on the development of higher cost heavy oil and bitumen reserves and less on cheaper conventional oil production. Many heavy oil and bitumen projects are capital and labour intensive and will lead to growth in other areas. These projects will require investments in oil upgrading facilities and pipelines to get the products to market. The planned expansions at both Suncor and Syncrude in the Fort McMurray region will likely proceed. A new greenfield mineable bitumen project being tested by Shell Canada Limited should also proceed early in the new millennium. The costs of extracting mineable reserves and in-situ reserves of bitumen will continue to drop as companies use new technology and more efficient production methods. Thus, other projects will likely be developed over the next ten years. Edmonton will play a major role in providing equipment and services to these developments.

By 2010, heavy oil and bitumen extraction will probably account for about 70-75 per cent of overall oil production in Alberta. Today, that proportion is about 45 per cent, with the rest being light conventional crude oil and natural gas liquids.

Future sector growth looks promising with about 3.0 per cent growth expected annually. Employment will likely grow by about 2.5 per cent annually.

Electric and Natural Gas Utilities

Overview

This sector includes utilities engaged in electric generation, transmission and distribution as well as gas distribution.

The electric and gas utilities business employed about 10,000 people in 1998.

Outlook

The outlook for this sector is not strong. In North America, the electric and natural gas utility industries are undergoing major restructuring and deregulation. Alberta is helping to lead this change. Deregulation in our province will lead to major employment changes. However, losses in utilities will be offset by new activities such as electricity trading, new technology firms and new services. These will be offered by unregulated affiliates of the utilities and new firms.

The components of the utility business will probably be broken into specific business activities such as power generation, transmission, distribution and retail energy services activities. Natural gas distribution will be separated into two parts: a regulated pipeline business and a retail gas or energy services component. More energy types will come together, along with a host of other services. This could lead to the creation of "mega-service" companies. Businesses will have more retail competition and offer greater customer choice. New firms that use combined cycle gas turbines (CCGT) will dominate the power generation business. These turbines will likely be "co-generating" power and steam at host industrial plants. New technologies, such as automated metering systems, will also be introduced.

Overall growth in this sector will be about 1.5 per cent while employment growth will be about 0.75 per cent annually.

Food Processing

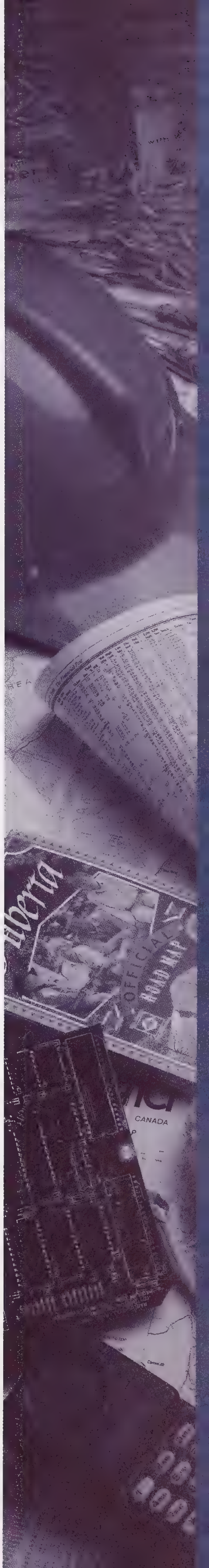
Overview

The agri-food sector in Alberta includes both food and beverage manufacturing and has been one of the province's fastest growing sectors, expanding at about 9 per cent annually over the past five years.

This industry employed about 17,000 people in 1998.

Outlook

Alberta's entire agricultural industry is evolving into an integrated "agribusiness" based on value-added food processing. Demographic and lifestyle changes are turning the food-processing sector into an array of customized smaller markets. Industry must meet the demands of a busy consumer who wants it all – convenience, specialty foods, speed and quality. There are good growth opportunities in exotic foods, ethnic foods and health food products. Genetically modified foods will likely become more common but may create concerns among



some consumers. “Nutraceuticals” - foods of benefit to health - may also become important specialty markets. Exporting products like beef and pork to areas such as the U.S. and Asia-Pacific will become more important for Alberta’s food industries.

The food processing industry will likely grow at about 4.5-5.5 per cent annually. Employment growth will likely be about 3.5 per cent annually.

Forest Products

Overview

The forest products industry in Alberta consists of the primary forestry sector and the secondary industries of pulp and wood processing. This industry has expanded significantly in recent years with the development of several new pulp mills.

The primary forest products industry employed about 4,000 people in 1998. The secondary manufacturing sector employed another 20,000.

Outlook

Future growth in forest products will likely be in the value-added manufacturing sector. This includes lumber products, paper, oriented strand board (OSB), specialized furniture, prefabricated homes and finished wood products. However, this growth will depend in part on whether Asia-Pacific demand for primary and secondary wood products returns to earlier levels. Alberta’s forest products industry could become more efficient through company mergers. The industry will also rely more on technology. There will be information systems in manufacturing operations and maintenance, new harvesting technology, geographic information systems and computer modeling to reduce the environmental impact. There may also be more conflict surrounding land use. In the sensitive terrains of the foothills environments, forestry sometimes competes with oil and gas exploration, ranching, mining, and tourism.

Overall growth in forest products appears to be good at about 3.0 per cent annually over the next decade. Employment will likely grow by about 1.5-2.0 per cent annually.

Metals Fabrication

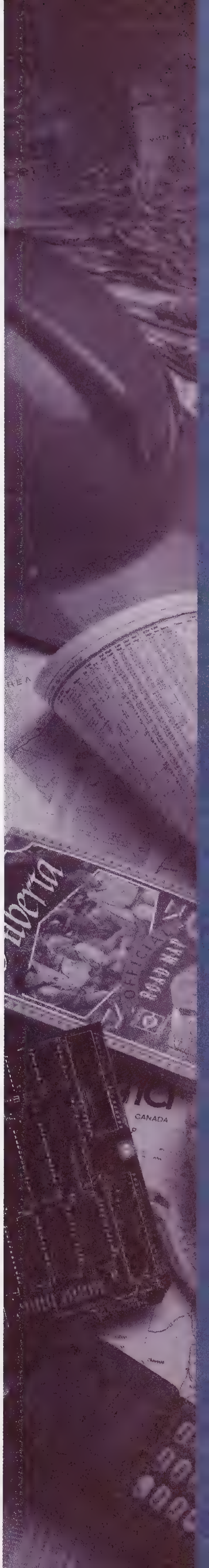
Overview

The metal fabricating industry has prospered in recent years in response to robust economic activity in Alberta especially in resource industry investment as well as major manufacturing additions in petrochemicals and power plants. The sector includes the fabrication of power boilers, heat exchangers, metal tanks and vessels as well as valves, fittings and fabricated metal pipes.

The sector employed about 19,000 people in Alberta in 1998.

Outlook

The future appears bright given proposed developments in the bitumen and heavy oil industry, petrochemicals and other manufacturing plants. However, competition is growing. Major project owners are consolidating and bidding practices are focusing more on cost control. Companies are seeking longer-term relationships with suppliers in an attempt to save money



and streamline processes. Metal fabricators must also focus more on quality. International Standards Organization (ISO 9000) certification is becoming more or less mandatory.

The metals fabrication industry, including machine shops, will probably grow at about 3.75 per cent annually. Employment growth will likely be about 3.0 per cent annually.

Natural Gas

Overview

Canada produces about 5.8 trillion cubic feet of natural gas per annum of which about 85 per cent is from Alberta. About half of Canada's natural gas is consumed domestically and about half exported to the United States. Canada's natural gas production has doubled over about the last ten years.

The oil and gas sectors combined employed about 68,000 people in 1998.

Outlook

The outlook for natural gas in the North American economy looks very bright. The electric power sector now has a strong preference for combined cycle gas turbines (CCGT). There will also be greater demand for exported Alberta gas as natural gas producers in the United States struggle to keep pace with demand. Such demand will generate exploration and development and also more processing plants, pipelines and storage facilities. However, there may also be more conflict surrounding land use. In the sensitive terrains of the foothills environments, the natural gas industry may compete with forestry, ranching, mining, and tourism.

Future growth of the natural gas sector is expected to be about 3.5 per cent annually. Employment growth will likely be about 2.75 per cent annually.

Petrochemicals

Overview

Alberta's petrochemical developments have been one of the major diversification successes of the last couple of decades. The sector consists of significant methanol production as well as ethylene and ethylene derivatives production at two major centres, Fort Saskatchewan and Joffre.

The petrochemical industry in Alberta employed about 11,000 people in 1998.

Outlook

New developments will boost the production of ethylene and ethylene derivatives in 2000. These developments are at the two major centres for petrochemicals, Fort Saskatchewan and Joffre. Many new developments include the co-production of electric power using combined cycle gas turbines (CCGT). Power will be produced for internal use. Excess power will be sold into the Alberta grid. This is happening at a time when the supply and demand of Alberta's electricity is tightly balanced.

In five to seven years, there may also be more development in ethylene chemistry and propylene chemistry. Much will depend on whether ethane and propane are affordable and available. This may not happen because of a major new pipeline project, the Alliance Pipeline.

The pipeline will not extract ethane and propane in Alberta but in Chicago, Illinois. Another potentially negative development in petrochemicals is that methanol and methyl tertiary butyl ether may see a drop in demand. California may legislate to remove this ether from its gasoline pool because of health concerns.

The industry will likely grow about 4.0 per cent annually over the next ten years. Employment growth over the same period is expected to be about 1.5 per cent annually.

Printing and Publishing

Overview

The sector consists of printing manufacturing plus related support services as well as publishing services.

The printing and publishing industry employed about 13,000 people in 1998.

Outlook

The printing and publishing industry is changing rapidly due to information technology and on-line communication tools. Recent evidence shows that the electronic media does not simply replace the print media. Rather, the two forms permit greater consumer choice, and in fact, may actually support each other. The Canadian publishing industry is vulnerable to competition from the United States, especially split-run magazines. Free-trade clashes may get worse as Canada attempts to protect its domestic publishing industry. Over the next decade, multi-media will become a major means for communicating creatively. Multi-media bring together different forms of expression, including text, graphics, data and voice.

This sector is expected to grow about 2.5 per cent annually. Employment will likely grow about 1.8 per cent annually.

Service Producing Industries

The following section presents a brief overview and outlook for each of these service producing industries:

- Business Services
- Education
- Finance, Insurance and Real Estate
- Government Services
- Health Care
- Information Technology
- Miscellaneous Services
- Rail Transport and Trucking
- Retail Trade
- Tourism
- Wholesale Trade

Business Services

Overview

This sector includes a range of professional, scientific and technical services including accounting, legal, engineering, architectural, and advertising as well as management and computer system consulting.

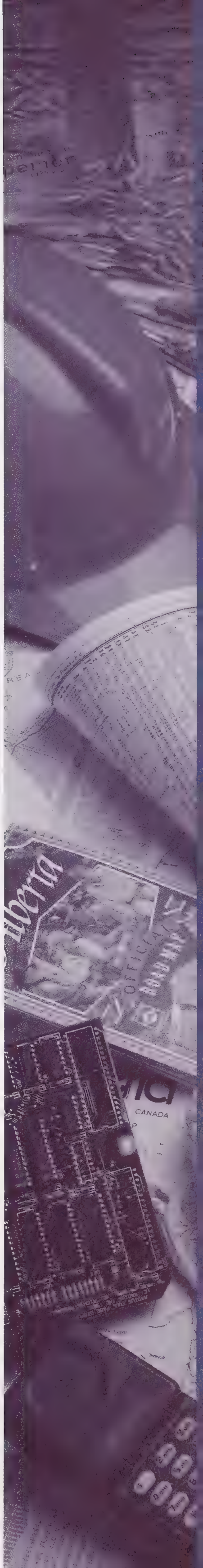
Business services is one of the largest sectors in Alberta, employing about 120,000 people in 1998.

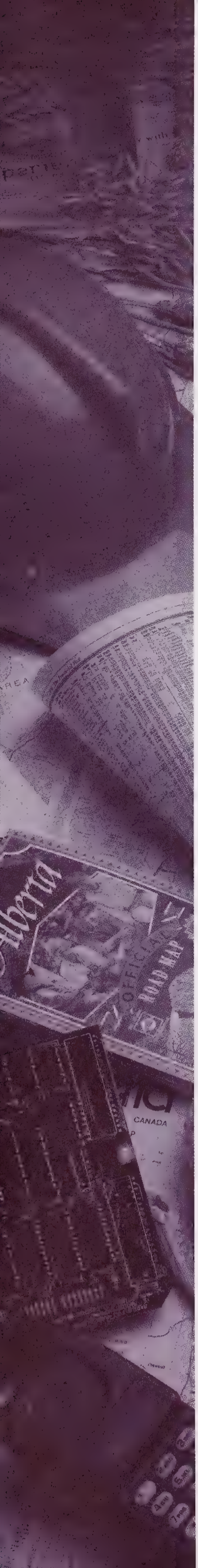
Outlook

The modern economy and society are becoming more complex. This will lead to growth in the demand for business services. Knowledge management is becoming a major competitive weapon for today's organizations. Computer services will be in demand as complex systems are put in place to integrate functions and create knowledge platforms within organizations. Management consulting will grow as companies look for new ideas, creative solutions, competitor intelligence, strategic planning and benchmarking advice, as well as cutting-edge knowledge management. New work environments will prosper as companies move towards "virtual offices" for "virtual corporations." Companies moving into the global economy will require specialized advice on dealing with cross-border issues, trade law and different cultural business practices.

Engineering consulting will continue to thrive from growth in the resources and resources-related industries, particularly bitumen and heavy oil extraction, petrochemicals, power generation and pipeline design. Engineering will also benefit from strong commercial activity such as warehousing, distribution, and retail outlets. There will also be strong demand for engineering services for road building and expansion of light rail transit systems. In future, we could also see a major upgrading of the aging Trans Canada highway system.

The business service sector will likely grow at an impressive rate of about 4.0 per cent annually over the next ten years. Employment will likely grow by about 3.3 per cent annually.





Education

Overview

This sector includes primary and secondary education, post-secondary education, other schools and educational support services.

Education remains one of the largest sectors, employing about 110,000 people in Alberta in 1998.

Outlook

In an economy that depends on knowledge, education will be the lynchpin for Alberta's global competitiveness. Lifelong learning is now recognized as an important ingredient for economic and other success. Adult education will be a growth business. The future will focus on offering choice in where, when, what and how education is delivered. Conventional teaching methods will still be very important. However, they will be supported by video-conferencing, CD-ROM applications, Internet technology and new computer-automated systems. Information technology opens up endless choices for the consumer, including major expansions in distance and home-based systems. There will be more education programs tailored to individual needs and preferences.

Education will also become a more global product. Content will be customized according to local and regional needs. Alberta's educational institutions are in a good position to penetrate the international teaching environment. Our institutions have high quality programs and a good reputation. The rest of the world also sees Canada as a non-intrusive culture.

A growing demand is forecasted for primary and secondary teachers especially in mathematics, science, second languages and aboriginal education.

Future education sector growth will likely be a moderate 2.8 per cent annually over the next ten years. Employment is expected to grow by about 2.5 per cent annually.

Finance, Insurance and Real Estate

Overview

This sector consists of banking and credit intermediation, securities, commodities and investment, financial investment, insurance, real estate services, and rental and leasing services.

This sector employed about 75,000 people in Alberta in 1998.

Outlook

The banking industry will be driven by changes in demographics, information technology and enhanced competition from foreign banks and domestic "near-banks." Most routine functions will be through automated banking machines (ATMs) or Internet banking. The number of bank branches will likely drop significantly. However, investment counselling and estate planning will grow. The banking business will make the most of the fact that an aging baby boom population uses these services. Mutual fund and retirement investing is expected to also grow very rapidly.

Banking and insurance services will come together into a seamless product of "financial and related services." The insurance industry will become more complex. There will likely be new coverage options, including insurance for events due to climate change such as global warming.

Alberta's real estate industry will likely stay active. There will be more people moving to Alberta as well as changes in living and housing styles. There also will be new types of households and more real estate transactions among aging baby boomers. The Internet will be used to get information and to screen properties. However, lawyers and real estate agents will still process and complete real estate sales.

The outlook for this sector is positive with about 3.0 per cent growth annually over the next ten years. Employment is expected to grow by about 2.3 per cent annually.

Government Services

Overview

This sector includes public administration for all levels of government – municipal, provincial and federal.

This sector employed about 65,000 people in Alberta in 1998.

Outlook

During the 1990s, the number of people employed in government dropped substantially. This trend is likely ending at all levels of governments. However, at the municipal level, some services may be streamlined and/or privatized.

Many believe that we now have the right number of employees to deliver essential public services. If the population continues to grow, there could be some very modest growth in public service employment. Government is looking at ways to attract and keep high quality staff in the public service. One challenge is the aging of the public service work force. In coming years, there will be many retiring employees who may be difficult to replace.

The public service sector will probably grow by about 2.0 per cent annually over the next five to ten years, although further contraction is also possible based on contracting out or privatization of services. Employment growth will be about 1.5 per cent annually.

Health Care

Overview

This sector comprises establishments primarily engaged in providing health care by diagnosis and treatment, and providing residential care for medical reasons.

Health care is one of the largest sectors in Alberta, employing about 120,000 people in 1998.

Outlook

Many believe that trying to meet the health care needs of an aging population is the major challenge of the next century. Alberta's population is somewhat younger than the Canadian

average, but it too is aging. The pressures that come with an aging population will become stronger around 2010. This is when the front wave of baby boomers will enter its 60s.

New technological developments will have a huge impact on the health care industry. There will be new (and expensive) super-drugs, genetically engineered drugs, new diagnostic techniques, gene therapy and wider applications of endosurgery (laparoscopic techniques). Information technology will become more common in the form of tele-medicine and long-distance diagnostics, counselling and eventually digital surgery. Information technology will reduce administration and information costs. Patient data and other information will be stored and retrieved electronically. There also will be electronic bedside monitoring and "smart cards."

Health care will be delivered very differently in the future. There will be a more community-based, integrated system to provide services. Alternative medical therapies should continue to grow and there will be more private sector service options. However, the core of today's public health system is expected to continue as the main way to deliver health care in Alberta.

Growth in the health care sector will likely be about 3.5 per cent annually over the next ten years. Employment will grow by a more modest 2.75 per cent annually.

Information Technology

Overview

This sector is often called the "high tech" sector. However, this sector is not well defined. It contains elements of a variety of industries including computer services, computer and electronic manufacturing, and telecommunications.

This sector employed about 40,000 people in Alberta in 1998.

Outlook

Over the last decade, information technology has been a real success story in the Alberta economy. It is emerging as the single most important factor in global competitiveness. Information technology influences virtually every sector of the economy. It also influences virtually every aspect of business – from production right through to distribution and marketing. As well, the boundaries between the various types of information technology are blurring. Telecommunications, computers and cable systems will ultimately become part of a digital information "melting pot."

Information technology may help keep prices down by giving consumers more information and choice in products and services. This increases competition among suppliers of those products and services. Information technology will also be used to automate manufacturing facilities for petrochemicals, furniture products, wood products and metal equipment. There will be a profound impact on services, especially banking, insurance, and business services. Information technology will also affect the accounting, billing and metering services of gas, electric and water utilities.

The resource industries will not be immune to the reach of information technology. It will influence a number of areas, including satellite communications for forestry practices, sophisticated seismic processing in oil and gas exploration, and increased automation in agricultural practices.

Over the next decade, strong sector growth seems certain with annual growth of about 8.0-10.0 per cent. Employment will likely grow at an impressive 6.0-7.0 per cent annually. Alberta is now developing a critical mass of advanced information technology specialists to ensure strong growth.

Miscellaneous Services

Overview

This sector includes repair and maintenance, personal and laundry services, security services, charitable foundations, religious and professional organizations and private household services.

The miscellaneous services sector employed about 80,000 people in Alberta in 1998.

Outlook

The personal and household services market is driven by time, a scarce commodity in modern living. This has led to more "contracting out" of household functions such as carpet cleaning, laundry, window cleaning, landscaping and snow removal. An aging population with more discretionary income may also consciously trade time for money. There will be rapid expansion in "pamper-me" services. People who want to relax and relieve stress will use services such as massage, relaxation therapy, and personal fitness training. They will also use the more traditional services such as beauty salons, spas and hairdressers. More people will also be concerned about home security. There will be strong growth in security and related services such as alarm systems, improved locking and bolting systems, window bars and house sitting.

Over the next decade, growth in miscellaneous services looks very promising at about 4.0 per cent annually. Employment growth over the same period should be about 3.5 per cent.

Rail Transport and Trucking

Overview

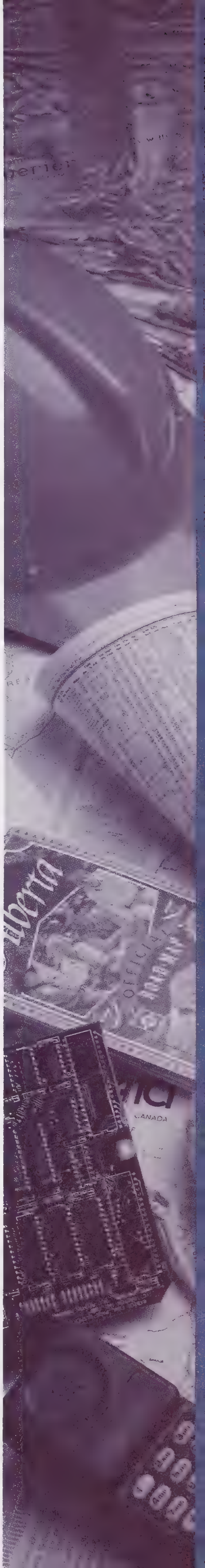
The industry is one of the lynchpins of the Alberta economy and is responsible for the movement of goods within Alberta and beyond its borders to other provinces, the United States and global markets.

This sector employed about 40,000 people in Alberta in 1998. The majority of these people, about 75 per cent, worked in the trucking sector.

Outlook - Trucking

Trucking is the dominant form of freight transportation in Alberta, hauling over 40 million tonnes of freight annually. Calgary is rapidly emerging as the wholesaling and distribution hub of western Canada, integrating freight movements by truck, rail and air. It could become a major centre for the planned CANAMEX transportation corridor that will span western Canada, the western United States and Mexico.

Technology will redefine the trucking industry with developments in truck design, brake-by-wire technology, weigh-in-motion technology and satellite communication systems. These are becoming essential in a world of just-in-time inventory and E-commerce. In future, the



trucking industry will likely be more consolidated. A few very large firms will focus on upgrading industry training and safety standards. However, there will still be a wide fringe of smaller firms because it costs relatively little to enter the industry.

Future growth in trucking looks positive at about 2.5 per cent annually over the next ten years. Employment growth is expected to be about 2.0 per cent over the same time.

Outlook - Rail

The outlook for the rail industry is less optimistic. Despite growth in petrochemicals, other manufactured products and inter-modal transport, there will likely be few gains in commodities such as coal, sulphur, wood pulp and agricultural commodities. Railways are also likely to focus even more on productivity and operating margins.

Annual growth of the rail industry will be about 1.0 per cent over ten years. Employment will likely shrink by about 0.5 per cent annually over the next decade.

Retail Trade

Overview

The retail trade sector comprises a broad spectrum of direct sales activities to the consumer including food, beverage, drug products, shoes, clothing, household furniture and appliances, automobile sales and servicing, department store merchandise and other retailing activities.

This is the largest sector in Alberta, employing about 175,000 people in 1998.

Outlook

Retail trade will become more competitive. Information technology will continue to revolutionize the retail sector by integrating management of the supply chain. Information technology will also permit more direct selling and eliminate some wholesale functions and middle-persons. Consumers will be able to choose what, when and where to buy. There should be strong growth in non-store shopping options including Internet, catalogue shopping and ordering by telephone. Information technology will also spur more home-based businesses by lowering distribution, overhead, advertising and promotion costs. Overall, there will be more specialized products and a rise in the number of small retail businesses. Canada's large department stores will continue to consolidate. Alberta's growing population, together with a rise in real disposable incomes, will also strengthen the sector.

Retail trade will likely grow by about 2.5 per cent annually over the next ten years. Employment growth is expected to average about 2.0 per cent over the same period.

Tourism

Overview

Tourism is captured within two industrial sectors: the accommodation/food and beverage sector, and the amusement and recreation sector.

These two sectors are very people-intensive and employed about 125,000 people in Alberta in 1998. However, only part of that number is tourism-related.

Outlook

Tourism is one of the fastest growing sectors in the world. In Alberta, the low value of the Canadian dollar, a pristine environment and tourist "icons" such as Banff, Jasper and Lake Louise make our province a prime tourist destination. Because of the Asian economic crisis, there are now fewer tourists from the Asia-Pacific region, especially Japan. However, this has been offset by an increase in visitors from the United States and Western Europe, particularly Britain and Germany. In future, there will likely be more tourists from areas such as southern Europe, South America, China and India. Over the next decade, changing demographics will also spur growth in tourism. Aging baby boomers with more money to spend will take more trips. Group travel will become less common. There will likely be more "soft-adventure" trips and a rise in "eco-tourism;" that is, tourism that leaves natural settings undisturbed.

Technology will transform the travel industry. More people will book trips on the Internet, and there will be specialty travel agents. Conventional travel agents will likely consolidate into mega-providers such as American Express and Carlson-Wagonlit. This will result in more sophisticated promotions, packaging and processing (the 3 "P"s) through the electronic media.

Over the next ten years, tourism in Alberta is expected to grow by about 6.0 per cent annually. Employment should grow by about 4.5 per cent annually.

Wholesale Trade

Overview

The wholesale trade industry is engaged in the purchase of merchandise for resale to retailers, or to commercial, industrial, institutional, farm and professional users. Wholesale trade includes wholesale merchants of food, personal and household goods, vehicles, building supplies and machinery, as well as agents and brokers of transportable goods.

The wholesale trade sector employed about 50,000 people in Alberta in 1998.

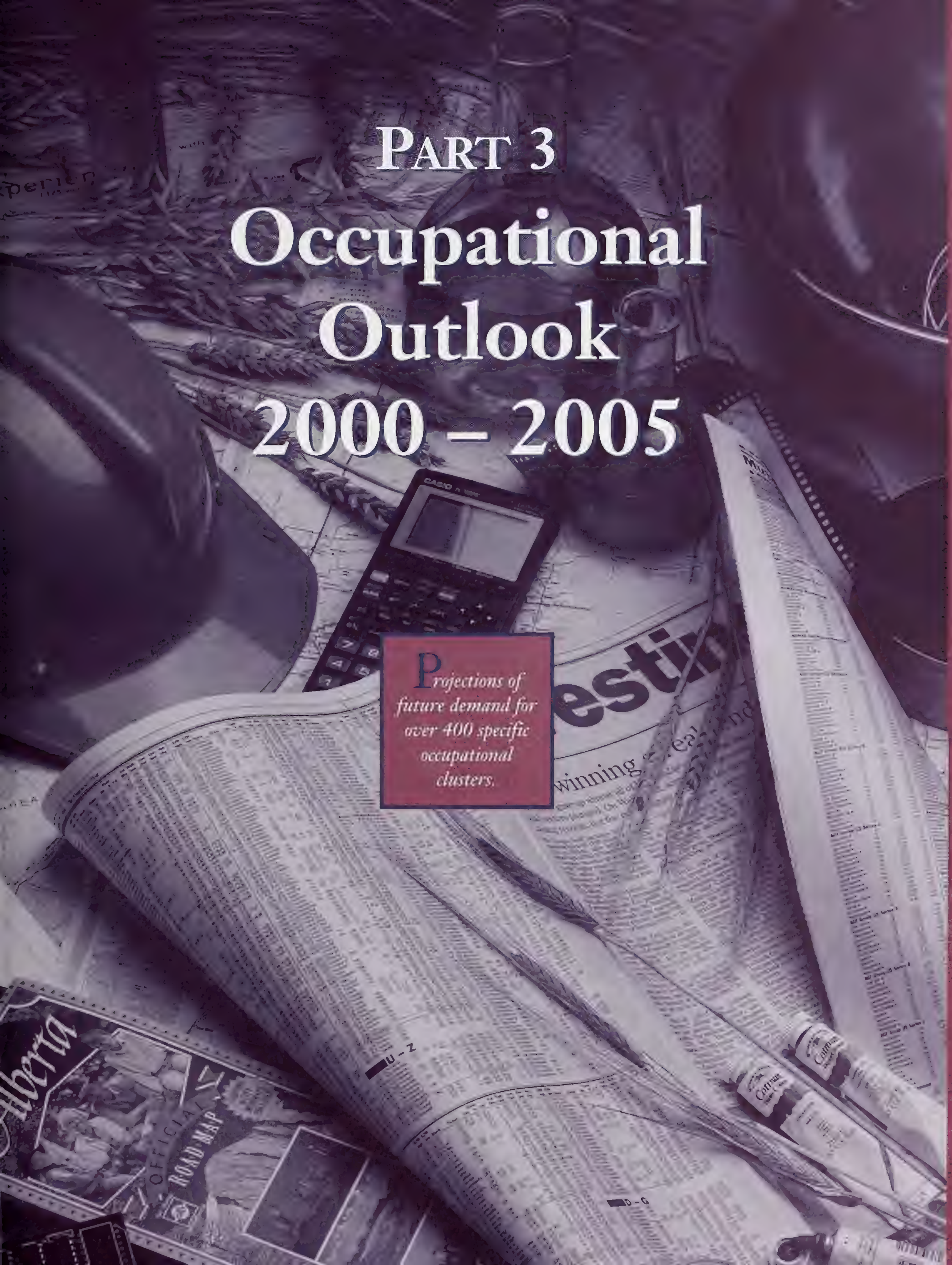
Outlook

Wholesale trade focuses heavily on information and transactions. It is being revolutionized by information technology. Traditional paper work is disappearing in favour of electronic communication and storage. Inventories are kept at a minimum in order to reduce overall costs. The wholesale sector is being restructured as new ways of delivering are developed. There is a strong trend toward delivering goods from the factory directly to the consumer. The Internet will also continue to have more impact on wholesale trade.

Calgary is emerging as a critical centre for distribution, warehousing and logistics. The city could emerge as an important part of a planned seamless CANAMEX trade route. The route will stretch from western Canada through the western United States to Mexico.

Growth of wholesale trade in Alberta is expected to continue at a rate of about 2.5 per cent annually. Employment growth will likely be a more modest 1.5 per cent, largely due to more efficient use of labour.

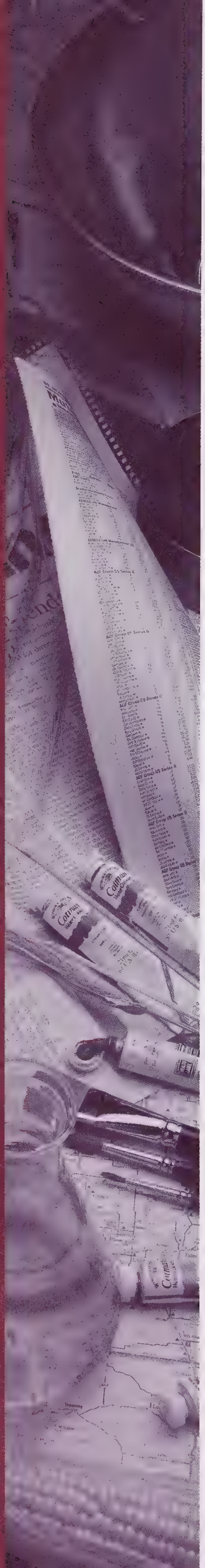
Part 2 of ***Alberta Careers Beyond 2000 Update*** has provided information on each of Alberta's 23 key industries in general as well as projected growth in these industries over the next ten years. In Part 3 we will look at projected demand first discussing general employment trends, then the outlook for large occupational groups and finally the outlook for specific occupational clusters.



PART 3

Occupational Outlook 2000 – 2005

Projections of future demand for over 400 specific occupational clusters.



The following presents an occupational outlook, or occupational projections, for Alberta for the period 2000-2005. These projections are based on information that was available in late 1999. However, because it is now 2000, we will consider these as five-year projections.

The demand for occupations changes according to a variety of factors including the business environment, overall level of economic activity, changes in consumer behaviour, and perhaps most importantly, growth in specific industrial sectors. The projections presented in this report are based on an analysis of these kinds of factors. Specifically, we have looked at the following:

- the outlook for the global and Alberta business environments
- the major forces of change
- the evolving world of work
- trends in 23 industry sectors in Alberta, including growth projections for the next ten years.

As we discussed earlier, understanding what is going on in these four major areas is critical to understanding what occupations are likely to be more, or less, in demand. It also helps us understand what the future holds in terms of general employment trends. The occupational projections presented here have been derived from an industry forecast and an “econometric” modelling process known as the Canadian Occupational Projection System (COPS.) The study covered over 400 occupational clusters under the National Occupational Classification (NOC) system.

This part of the report is divided into three sections:

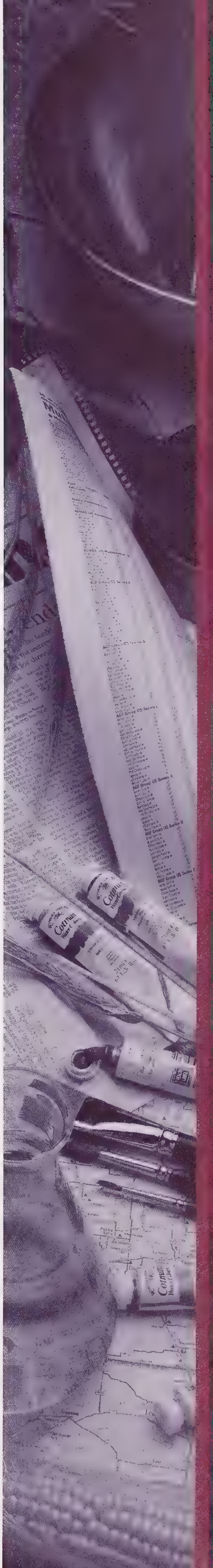
- Projected Demand: General Employment Trends
- Projected Demand: Occupational Groups
- Projected Demand: Specific Occupational Clusters

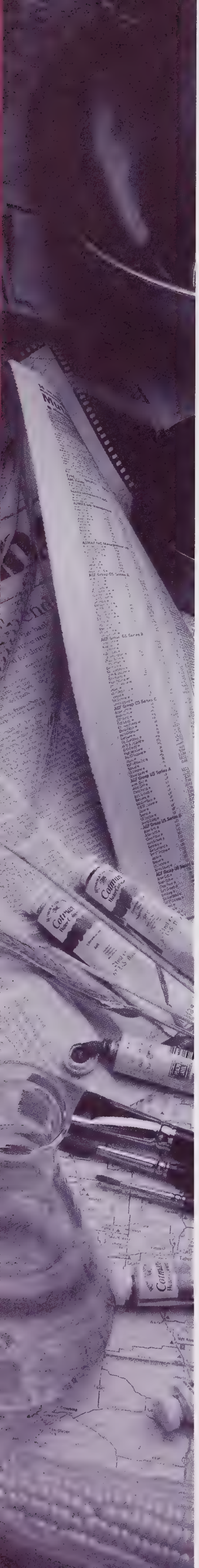
Each section presents information derived from Dr. Goodman’s industrial projections and the COPS model. The first section provides his projections regarding general employment trends. The next section outlines projections regarding demand for broad occupational groups. The last, and most substantial section, presents projections regarding demand for specific occupational clusters. These projections for occupational clusters are for the next five years; that is, up to the year 2005, because there are so many factors that can affect the growth of specific occupations that it is virtually impossible to predict how those factors may change over a longer period of time. Readers will note that this is different than the ten-year time frame used for the projections of industrial growth.

Projected Demand: General Employment Trends

Following are Dr. Goodman's general findings regarding future employment trends in Alberta.

- **The challenge for Alberta will not be job creation.** Occupations in Alberta are expected to grow at about 2.9 per cent annually for the next ten years. Economic growth in the province should be about 3.5 per cent over the same period. Therefore, the real challenge will be matching the demands of the new workplace and evolving economy with the skills of its workforce. Society as a whole may have difficulty keeping pace with this economic change and restructuring. Expect there to be unemployment in one area while there are serious shortages of workers in another.
- **Employment growth will not fit neatly into any one category or industrial sector.** There will be employment growth across a range of industries including resources, manufacturing, services and high technology. Still, within these broad categories, there will be weak and strong performers.
- **More education and training will be key to success in the new economy.** However, it must be the right education and training. Whether at the professional, technologist or trade levels, new jobs will favour the well qualified.
- **Over the next five years, there will be a strong demand for occupations that need university degrees.** This is particularly so for degrees in computing and allied subjects, commerce graduates, and more specialized degrees in tourism, nursing and industrial and electronic engineering. Projections indicate that 16 per cent of all new jobs will go to university graduates. Middle and senior management occupations overall will likely also grow, especially in business services. Occupations in middle and senior management will account for another 13 per cent of new employment. Most of these occupations also require a university or college education.
- **A further 30 per cent of all new jobs will be in occupations requiring post-secondary college, technical and trades training.** This will be driven by strong demand from the information technology industry. Infrastructure, as well as large industrial and commercial construction projects, will need skilled trades people.
- **A further 30 per cent of jobs will be in occupations requiring completion of grade 12.** This demand will be driven by growth in sectors such as retail, food and accommodation, and tourism.
- **Occupations requiring less than grade 12 will likely only account for about 12 per cent of new jobs.**





Projected Demand: Occupational Groups

Following is a summary of Dr. Goodman's general outlook for broad occupational groups in Alberta. For information on projected demand for specific occupation clusters, please see the section titled Projected Demand: Specific Occupational Clusters.

Over the next five years:

- **The demand for tradespeople looks robust.** This is especially true for construction-related trades people. There will be major projects in oil and gas, petrochemicals, power plants, manufacturing, office buildings, and retail space. There will also be construction of basic infrastructure such as roads and light rail transit.
- **Highly trained computer engineers, scientists and technicians will be in high demand.** The information technology sector is reaching a point where it can be a key part of the Alberta economy. In future, it could be a major engine of growth.
- **Health care will stage a comeback.** After several lean years, there will be strong demand for nurses, medical radiation technologists and other health related occupations.
- **The education field will stage a comeback.** This will be based in part on changing demographics such as a rise in the number of retired people interested in taking courses. There will also be more demand for education and training that is specific to occupations. More private education and training options will become available.
- **Engineers in many areas will be in demand.** This will be especially so in the industrial and electronic areas. There may also be more demand from the oil and gas industry.
- **There should be a strong demand for occupations in business, financial advisory and personal services.** As modern society becomes more complex, the demand for specialized management and financial expertise will grow. In a world of limited time, more people will "contract out" services. Such services include landscaping, food delivery services, house cleaning, and household repair services.

Projected Demand: Specific Occupational Clusters

The previous section provided information on projected demand for broad occupational groups. This section presents the Canadian Occupational Projection System (COPS) model growth projections for specific occupational clusters. Here, you will find detailed information for over 400 occupational clusters at the 4-digit level of the National Occupational Classification (NOC) system.

The five-year projections for specific occupational clusters are presented in a table starting on page 40. The table provides the following information:

Occupational Clusters

Occupational clusters are listed alphabetically. In some cases, the cluster is grouped by industry or type of occupation rather than just by title. For example, "Aeronautics Engineer" is listed under "A" for aeronautics instead of "E" for engineer.

NOC

This is the National Occupational Classification number. Each occupation has a NOC number. It is a system for classifying occupations in Canada. Please see the Glossary of Terms at the back of this publication for more information.

Annual Projected Growth Rate

An annual growth rate has been projected for each occupational cluster. There are five categories/columns of growth as follows:

- Well above average growth: 4.0 per cent and above
- Above average growth: 3.3 to 3.9 per cent
- Average growth: 2.4 to 3.2 per cent
- Below average growth: 1.9 to 2.3 per cent
- Well below average growth: 1.8 per cent and below

Number of people in this occupational cluster

This column shows approximately how many people worked in this occupational cluster in Alberta in 1999. The five main categories are as follows:

- 10,000 or more (Very Large)
- 5,000 – 10,000 (Large)
- 1,000 – 5,000 (Moderate)
- 500 – 1,000 (Small)
- Less than 500 (Very Small)

Please see ***Appendix A – Glossary of Terms*** at the back of this publication for other useful definitions.

Projected Demand: Specific Occupational Clusters

		Projected Growth†					
Occupational Clusters	NOC*	Well above average	Above average	Average	Below average	Well below average	Number of People in this Occupational Cluster in Alberta (1999)
Accommodation Service Managers	0632	✓					1,000 - 5,000
Accounting and Related Clerks	1431			✓			30,000 or more
Actors	5135		✓				Less than 500
Administrators: Post-Secondary Education and Other Vocational Training	0312			✓			500 - 1,000
Administrative Clerks	1441				✓		10,000 or more
Administrative Officers	1221			✓			10,000 or more
Aerospace Engineers	2146	✓					Less than 100
Agricultural and Fish Products Inspectors	2222				✓		About 500
Agricultural and Related Service Contractors and Managers	8252				✓		500 - 1,000
Agricultural Representatives, Consultants and Specialists	2123					✓	500 - 1,000
Air Pilots, Flight Engineers and Flying Instructors	2271			✓			1,000 - 5,000
Air Traffic Control Occupations	2272			✓			500 - 1,000
Air Transport Ramp Attendants	7437			✓			1,000 - 5,000
Aircraft Instrument, Electrical and Avionics Mechanics, Technicians and Inspectors	2244			✓			500 - 1,000
Aircraft Mechanics and Aircraft Inspectors	7315			✓			1,000 - 5,000
Airline Sales and Service Agents	6433				✓		1,000 - 5,000
Ambulance Attendants and Other Paramedical Occupations	3234		✓				1,000 - 5,000
Animal Health Technologists	3213				✓		About 500
Announcers and Other Broadcasters	5231		✓				About 1,000
Applied Chemical Technologists and Technicians	2211			✓			1,000 - 5,000
Aquaculture and Marine Harvest Labourers	8613	NA					Less than 100
Architects	2151			✓			500 - 1,000
Architectural Technologists and Technicians	2251			✓			Less than 500
Archivists	5113					✓	Less than 100
Artisans and Craftspersons	5244			✓			1,000 - 5,000
Assemblers and Inspectors, Electrical Appliance, Apparatus and Equipment Manufacturing	9484			✓			Less than 500
Assemblers, Fabricators and Inspectors, Industrial Electrical Motors and Transformers	9485	✓					500 - 1,000
Assessors, Valuators and Appraisers	1235					✓	1,000 - 5,000
Athletes	5251				✓		Less than 500
Attendants: Amusement, Recreation and Sport	6670			✓			1,000 - 5,000
Audio and Video Recording Technicians	5225		✓				500 - 1,000
Audiologists and Speech/Language Pathologists	3141			✓			500 - 1,000
Automotive Mechanical Installers and Servicers	7443				✓		1,000 - 5,000
Babysitters, Nannies and Parents Helpers	6474			✓			About 20,000
Bakers	6252			✓			1,000 - 5,000
Banking, Credit and Other Investment Managers	0122				✓		1,000 - 5,000
Banking, Insurance and Other Financial Clerks	1434				✓		1,000 - 5,000
Bartenders	6452		✓				About 5,000
Binding and Finishing Machine Operators	9473					✓	500 - 1,000
Biological Technologists and Technicians	2221				✓		1,000 - 5,000
Biologists and Related Scientists	2121					✓	1,000 - 5,000

*** National Occupational Classification Number**

† Well above average: 4% and above. Above average: 3.3% – 3.9%. Average: 2.4% – 3.2%. Below average: 1.9% – 2.3%. Well below average: 1.8% and below.

Projected Demand: Specific Occupational Clusters

Occupational Clusters	NOC*	Projected Growth† Well above average	Above average	Average	Below average	Well below average	Number of People in this Occupational Cluster in Alberta (1999)
Blacksmiths and Die Setters	7266					✓	Less than 100
Boilermakers	7262	✓					500 - 1,000
Bookkeepers	1231			✓			10,000 or more
Bricklayers	7281	✓					500 - 1,000
Broadcast Technicians	5224		✓				Less than 500
Bus Drivers, Subway Operators and Other Transit Operators	7412				✓		5,000 - 10,000
Butchers and Meat Cutters, Retail and Wholesale	6251				✓		1,000 - 5,000
By-law Enforcement and Other Regulatory Officers, n.e.c. (not elsewhere classified)	6463		✓				500 - 1,000
Cabinetmakers	7272			✓			1,000 - 5,000
Cable Television Service and Maintenance Technicians	7247		✓				About 500
Camera, Platemaking and Other Pre-Press Occupations	9472					✓	Less than 500
Cardiology Technologists	3217		✓				About 100
Carpenters	7271		✓				10,000 or more
Cashiers	6611			✓			20,000 or more
Cement Finishers	7282	✓					About 1,000
Central Control and Process Operators, Mineral and Metal Processing	9231					✓	Less than 500
Chain Saw and Skidder Operators	8421					✓	500 - 1,000
Chefs	6241		✓				1,000 - 5,000
Chemical Engineers	2134		✓				1,000 - 5,000
Chemical Plant Machine Operators	9421		✓				500 - 1,000
Chemists	2112			✓			1,000 - 5,000
Chiropractors	3122			✓			Less than 500
Civil Engineering Technologists and Technicians and Construction Estimators	2230	✓					1,000 - 5,000
Civil Engineers	2131	✓					1,000 - 5,000
Cleaning Supervisors	6215					✓	1,000 - 5,000
Coaches	5252			✓			500 - 1,000
Collectors	1435			✓			1,000 - 5,000
College and Other Vocational Instructors	4131		✓				5,000 - 10,000
Commercial Divers	7382		✓				Less than 100
Commissioned Police Officers	0641			✓			About 100
Community and Social Service Workers	4212		✓				5,000 - 10,000
Computer Engineers	2147	✓					1,000 - 5,000
Computer Operators	1421			✓			1,000 - 5,000
Computer Programmers	2163	✓					5,000 - 10,000
Computer Systems Analysts	2162	✓					10,000 or more
Concrete, Clay and Stone Forming Operators	9414	✓					About 500
Conductors, Composers and Arrangers	5132			✓			About 100
Conference and Event Planners	1226		✓				500 - 1,000
Conservation and Fishery Officers	2224					✓	500 - 1,000
Conservators and Curators	5112			✓			Less than 500
Construction Inspectors	2264	✓					500 - 1,000
Construction Managers	0711	✓					5,000 - 10,000

*** National Occupational Classification Number**

† Well above average: 4% and above. Above average: 3.3% – 3.9%. Average: 2.4% – 3.2%. Below average: 1.9% – 2.3%. Well below average: 1.8% and below.

Projected Demand: Specific Occupational Clusters

		Projected Growth†					
Occupational Clusters	**NOC***	**Well above average**	**Above average**	**Average**	**Below average**	**Well below average**	**Number of People in this Occupational Cluster in Alberta (1999)**
Construction Millwrights and Industrial Mechanics (Except Textile)	7311		✓				5,000 - 10,000
Construction Trades Helpers and Labourers	7611	✓					10,000 or more
Contractors and Supervisors, Metal Forming, Shaping and Erecting Occupations	7214	✓					1,000 - 5,000
Contractors and Supervisors, Other Construction Trades, Installers, Repairers and Servicers	7219	✓					1,000 - 5,000
Contractors and Supervisors, Electrical Trades and Telecommunications Occupations	7212	✓					1,000 - 5,000
Contractors and Supervisors, Carpentry Trades	7215			✓			1,000 - 5,000
Contractors and Supervisors, Heavy Construction Equipment Crews	7217	✓					1,000 - 5,000
Contractors and Supervisors, Mechanic Trades	7216			✓			1,000 - 5,000
Contractors and Supervisors, Pipefitting Trades	7213	✓					500 - 1,000
Cooks	6242			✓			20,000 or more
Correctional Service Officers	6462			✓			1,000 - 5,000
Correspondence, Publication and Related Clerks	1452			✓			500 - 1,000
Couriers and Messengers	1463			✓			5,000 - 10,000
Court Clerks	1443		✓				Less than 500
Court Officers and Justices of the Peace	1227					✓	Less than 500
Court Recorders and Medical Transcriptionists	1244			✓			500 - 1,000
Crane Operators	7371	✓					1,000 - 5,000
Customer Service, Information and Related Clerks	1453		✓				5,000 - 10,000
Customs, Ship and Other Brokers	1236			✓			500 - 1,000
Dancers	5134		✓				500 - 1,000
Data Entry Clerks	1422				✓		5,000 - 10,000
Deck Crew, Water Transport	7433					✓	Less than 100
Deck Officers, Water Transport	2273					✓	Less than 100
Delivery Drivers	7414			✓			5,000 - 10,000
Dental Assistants	3411			✓			1,000 - 5,000
Dental Technicians and Laboratory Bench Workers	3220				✓		500 - 1,000
Dental Therapists and Dental Hygienists	3222			✓			500 - 1,000
Dentists	3113			✓			1,000 - 5,000
Denturists	3221				✓		Less than 500
Dietitians and Nutritionists	3132			✓			500 - 1,000
Dispatchers and Radio Operators	1475				✓		1,000 - 5,000
Drafting Technologists and Technicians	2253			✓			1,000 - 5,000
Drillers and Blasters - Surface Mining, Quarrying and Construction	7372				✓		Less than 500
Dry Cleaning and Laundry Occupations	6681		✓				1,000 - 5,000
Dry Cleaning and Laundry Supervisors	6214					✓	Less than 500
Early Childhood Educators and Assistants	6470			✓			About 10,000
Economic Development Officers and Marketing Researchers and Consultants	4163		✓				1,000 - 5,000
Economists and Economic Policy Researchers and Analysts	4162			✓			500 - 1,000
Editors	5122			✓			500 - 1,000
Education Policy Researchers, Consultants and Program Officers	4166					✓	1,000 - 5,000
Electric Appliance Servicers and Repairers	7332			✓			500 - 1,000

*** National Occupational Classification Number**

† Well above average: 4% and above. Above average: 3.3% – 3.9%. Average: 2.4% – 3.2%. Below average: 1.9% – 2.3%. Well below average: 1.8% and below.

Projected Demand: Specific Occupational Clusters

		Projected Growth†					
Occupational Clusters	**NOC***	**Well above average**	**Above average**	**Average**	**Below average**	**Well below average**	**Number of People in this Occupational Cluster in Alberta (1999)**
Electrical and Electronics Engineering Technologists and Technicians	2241	✓					1,000 - 5,000
Electrical and Electronics Engineers	2133	✓					1,000 - 5,000
Electrical Mechanics	7333			✓			500 - 1,000
Electrical Power Line and Cable Workers	7244			✓			About 1,000
Electricians (Except Industrial and Power System)	7241		✓				5,000 - 10,000
Electroencephalographic and Other Diagnostic Technologists, n.e.c. (not elsewhere classified)	3218	✓					About 100
Electronic Service Technicians (Household and Business Equipment)	2242		✓				5,000 - 10,000
Electronics Assemblers, Fabricators, Inspectors and Testers	9483	✓					1,000 - 5,000
Elemental Medical and Hospital Assistants	6631		✓				About 1,000
Elementary and Secondary School Teacher Assistants	6472		✓				5,000 - 10,000
Elementary School and Kindergarten Teachers	4142			✓			20,000 or more
Elevator Constructors and Mechanics	7318			✓			Less than 500
Employment Counsellors	4213			✓			1,000 - 5,000
Engineer Officers, Water Transport	2274					✓	Less than 100
Engineering Inspectors and Regulatory Officers	2262	✓					Less than 500
Engineering, Science and Architecture Managers	0210				✓		1,000 - 5,000
Estheticians, Electrologists and Related Occupations	6482				✓		1,000 - 5,000
Executive Assistants	1222			✓			1,000 - 5,000
Executive Housekeepers	6213				✓		500 - 1,000
Fabric, Fur and Leather Cutters	9452				✓		Less than 500
Facility Operation and Maintenance Managers	0720					✓	1,000 - 5,000
Family, Marriage and Other Related Counsellors	4153		✓				1,000 - 5,000
Farm Supervisors and Specialized Livestock Workers	8253					✓	1,000 - 5,000
Farmers and Farm Managers	8251					✓	40,000 or more
Film and Video Camera Operators	5222		✓				Less than 500
Financial and Investment Analysts	1112	✓					1,000 - 5,000
Financial Auditors and Accountants	1111		✓				10,000 or more
Financial Managers	0111			✓			1,000 - 5,000
Fire Chiefs and Senior Firefighting Officers	0642			✓			About 100
Firefighters	6262			✓			1,000 - 5,000
Floor Covering Installers	7295		✓				1,000 - 5,000
Food and Beverage Servers	6453		✓				20,000 or more
Food Service Counter Attendants and Food Preparers	6641		✓				10,000 or more
Food Service Supervisors	6212				✓		1,000 - 5,000
Forestry Professionals	2122					✓	Less than 500
Forestry Technologists and Technicians	2223					✓	About 500
Forging Machine Operators	9512		✓				Less than 100
Foundry Workers	9412				✓		Less than 500
Funeral Directors and Embalmers	6272				✓		Less than 500
Furniture and Fixture Assemblers and Inspectors	9492		✓				1,000 - 5,000
Furniture Finishers and Refinishers	9494	✓					500 - 1,000
Gas Fitters	7253		✓				500 - 1,000
General Farm Workers	8431					✓	20,000 or more

*** National Occupational Classification Number**

† Well above average: 4% and above. Above average: 3.3% – 3.9%. Average: 2.4% – 3.2%. Below average: 1.9% – 2.3%. Well below average: 1.8% and below.

Projected Demand: Specific Occupational Clusters

Occupational Clusters	NOC*	Projected Growth†					Number of People in this Occupational Cluster in Alberta (1999)
		Well above average	Above average	Average	Below average	Well below average	
General Office Clerks	1411			✓			10,000 or more
General Practitioners and Family Physicians	3112			✓			1,000 - 5,000
Geological and Mineral Technologists and Technicians	2212			✓			1,000 - 5,000
Geological Engineers	2144			✓			Less than 500
Geologists, Geochemists and Geophysicists	2113			✓			1,000 - 5,000
Glass Forming and Finishing Machine Operators and Glass Cutters	9413		✓				Less than 500
Glaziers	7292			✓			500 - 1,000
Government Managers: Economic Analysis, Policy Development and Program Administration	0412				✓		Less than 500
Government Managers: Education Policy Development and Program Administration	0413			✓			Less than 500
Government Managers: Health and Social Policy Development and Program Administration	0411					✓	Less than 500
Grain Elevator Operators	6234					✓	500 - 1,000
Graphic Arts Technicians	5223			✓			Less than 500
Graphic Designers and Illustrating Artists	5241		✓				1,000 - 5,000
Grocery Clerks and Shelf Stockers	6622				✓		10,000 or more
Hairstylists and Barbers	6271			✓			5,000 - 10,000
Harvesting Labourers	8611					✓	Less than 500
Head Nurses and Supervisors	3151			✓			1,000 - 5,000
Health and Social Policy Researchers, Consultants and Program Officers	4160			✓			1,000 - 5,000
Heavy Equipment Operators (Except Crane)	7421	✓					10,000 or more
Heavy-Duty Equipment Mechanics	7312	✓					5,000 - 10,000
Hide and Pelt Processing Workers	9453			✓			Less than 500
Hotel Front Desk Clerks	6435			✓			1,000 - 5,000
Human Resources Managers	0112			✓			1,000 - 5,000
Human Resources Specialists	1121	✓					1,000 - 5,000
Image. Social and Other Personal Consultants	6481			✓			Less than 500
Immigration, Unemployment Insurance and Revenue Officers	1228					✓	500 - 1,000
Industrial Butchers and Meat Cutters, Poultry Preparers and Related Workers	9462		✓				1,000 - 5,000
Industrial and Manufacturing Engineers	2141		✓				500 - 1,000
Industrial Designers	2252		✓				Less than 500
Industrial Electricians	7242		✓				1,000 - 5,000
Industrial Engineering and Manufacturing Technologists and Technicians	2233	✓					500 - 1,000
Industrial Instrument Technicians and Mechanics	2243		✓				1,000 - 5,000
Information Systems and Data Processing Managers	0213		✓				1,000 - 5,000
Inspectors and Testers, Mineral and Metal Processing	9415				✓		Less than 500
Inspectors: Public and Environmental Health and Occupational Health and Safety	2263		✓				1,000 - 5,000
Instructors and Teachers of Disabled Persons	4215		✓				About 1,000
Insulators	7293	✓					1,000 - 5,000
Insurance Adjusters and Claims Examiners	1233				✓		1,000 - 5,000
Insurance Agents and Brokers	6231				✓		5,000 - 10,000
Insurance Underwriters	1234				✓		500 - 1,000

*** National Occupational Classification Number**

† Well above average: 4% and above. Above average: 3.3% – 3.9%. Average: 2.4% – 3.2%. Below average: 1.9% – 2.3%. Well below average: 1.8% and below.

Projected Demand: Specific Occupational Clusters

		Projected Growth†					
Occupational Clusters	**NOC***	**Well above average**	**Above average**	**Average**	**Below average**	**Well below average**	**Number of People in this Occupational Cluster in Alberta (1999)**
Insurance, Real Estate and Financial Brokerage Managers	0121				✓		1,000 - 5,000
Interior Designers	5242		✓				500 - 1,000
Ironing, Pressing and Finishing Occupations	6682				✓		500 - 1,000
Ironworkers	7264	✓					1,000 - 5,000
Janitors, Caretakers and Building Superintendents	6663			✓			30,000 or more
Jewellers, Watch Repairers and Related Occupations	7344				✓		Less than 500
Journalists	5123			✓			About 1,000
Judges	4111			✓			Less than 500
Kitchen and Food Service Helpers	6642		✓				10,000 or more
Labourers: Chemical Products Processing and Utilities	9613		✓				1,000 - 5,000
Labourers: Food, Beverage and Tobacco Processing	9617		✓				5,000 - 10,000
Labourers: Metal Fabrication	9612		✓				1,000 - 5,000
Labourers: Mineral and Metal Processing	9611				✓		500 - 1,000
Labourers: Rubber and Plastic Products Manufacturing	9615			✓			500 - 1,000
Labourers: Textile Processing	9616			✓			Less than 500
Labourers: Wood, Pulp and Paper Processing	9614					✓	1,000 - 5,000
Land Surveyors, Professional	2154			✓			1,000 - 5,000
Landscape and Horticulture Technicians and Specialists	2225	✓					1,000 - 5,000
Landscape Architects	2152		✓				Less than 100
Landscaping and Grounds Maintenance Contractors and Managers	8255	✓					500 - 1,000
Landscaping and Grounds Maintenance Labourers	8612		✓				5,000 - 10,000
Lawyers and Quebec Notaries	4112		✓				5,000 - 10,000
Legal Secretaries	1242		✓				1,000 - 5,000
Letter Carriers	1462				✓		1,000 - 5,000
Librarians	5111			✓			1,000 - 5,000
Library and Archive Technicians and Assistants	5211			✓			1,000 - 5,000
Library Clerks	1451		✓				1,000 - 5,000
Library, Archive, Museum and Art Gallery Managers	0511			✓			Less than 500
Light Duty Cleaners	6661			✓			10,000 or more
Loan Officers	1232				✓		1,000 - 5,000
Logging and Forestry Labourers	8616				✓		1,000 - 5,000
Logging Machinery Operators	8241			✓			1,000 - 5,000
Lumber Graders and Other Wood Processing Inspectors and Graders	9436				✓		Less than 500
Machine Fitters	7316			✓			Less than 500
Machine Operators, Metal and Mineral Processing	9410			✓			Less than 500
Machining Tool Operators	9511		✓				500 - 1,000
Machinists and Machining and Tooling Inspectors	7231			✓			1,000 - 5,000
Mail, Postal and Related Clerks	1461			✓			1,000 - 5,000
Maitres d'hotel and Hosts/Hostesses	6451			✓			1,000 - 5,000
Managers: Health Care	0311		✓				1,000 - 5,000
Managers: Publishing, Motion Pictures, Broadcasting and Performing Arts	0512		✓				1,000 - 5,000
Managers: Social, Community and Correctional Services	0314		✓				1,000 - 5,000
Manufacturing Managers	0911			✓			1,000 - 5,000

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Projected Demand: Specific Occupational Clusters

		Projected Growth†					
Occupational Clusters	**NOC***	**Well above average**	**Above average**	**Average**	**Below average**	**Well below average**	**Number of People in this Occupational Cluster in Alberta (1999)**
Mapping and Related Technologists and Technicians	2255					✓	Less than 500
Material Handlers	7452			✓			10,000 or more
Mathematicians, Statisticians and Actuaries	2161	✓					Less than 500
Mechanical Assemblers and Inspectors	9486				✓		500 - 1,000
Mechanical Engineering Technologists and Technicians	2232	✓					500 - 1,000
Mechanical Engineers	2132	✓					1,000 - 5,000
Medical Laboratory Technicians	3212		✓				1,000 - 5,000
Medical Laboratory Technologists and Pathologists Assistants	3211		✓				1,000 - 5,000
Medical Radiation Technologists	3215	✓					1,000 - 5,000
Medical Secretaries	1243			✓			1,000 - 5,000
Medical Sonographers	3216		✓				Less than 500
Metalworking Machine Operators, Light and Heavy	9514		✓				500 - 1,000
Metallurgical and Materials Engineers	2142			✓			Less than 500
Meteorological Technicians	2213					✓	Less than 100
Meteorologists	2114					✓	Less than 500
Midwives and Practitioners of Natural Healing	3232	✓					Less than 500
Mine Labourers	8614					✓	Less than 500
Mining Engineers	2143			✓			Less than 500
Ministers of Religion	4154			✓			1,000 - 5,000
Motor Vehicle Assemblers, Inspectors and Testers	9482					✓	Less than 500
Motor Vehicle Body Repairers	7322			✓			1,000 - 5,000
Motor Vehicle Mechanics, Technicians and Mechanical Repairers	7321			✓			10,000 or more
Motorcycle and Other Related Mechanics	7334				✓		Less than 500
Musicians and Singers	5133		✓				1,000 - 5,000
Natural and Applied Science Policy Researchers, Consultants and Program Officers	4161		✓				1,000 - 5,000
Nondestructive Testers and Inspectors	2261	✓					1,000 - 5,000
Nurse Aides and Orderlies	3413		✓				5,000 - 10,000
Nursery and Greenhouse Operators and Managers	8254			✓			Less than 500
Nursery and Greenhouse Workers	8432		✓				1,000 - 5,000
Occupational Therapists	3143			✓			1,000 - 5,000
Oil and Gas Drilling, Servicing and Related Labourers	8615			✓			5,000 - 10,000
Oil and Gas Well Drillers, Servicers, Testers and Related Workers	8232		✓				1,000 - 5,000
Oil and Gas Well Drilling Workers and Services Operators	8412		✓				5,000 - 10,000
Oil and Solid Fuel Heating Mechanics	7331					✓	Less than 500
Opticians	3231			✓			500 - 1,000
Optometrists	3121		✓				Less than 500
Other Administrative Services Managers	0114			✓			1,000 - 5,000
Other Aides and Assistants: Support of Health Services	3414			✓			1,000 - 5,000
Other Assemblers and Inspectors	9498			✓			Less than 500
Other Attendants: Accommodation and Travel (Except Airline Travel)	6672			✓			Less than 500
Other Business Services Managers	0123	✓					1,000 - 5,000
Other Elemental Sales Occupations	6623			✓			5,000 - 10,000
Other Elemental Service Occupations	6683				✓		1,000 - 5,000

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Projected Demand: Specific Occupational Clusters

		Projected Growth†					
Occupational Clusters	**NOC***	**Well above average**	**Above average**	**Average**	**Below average**	**Well below average**	**Number of People in this Occupational Cluster in Alberta (1999)**
Other Financial Officers	1114			✓			1,000 - 5,000
Other Instructors	4216			✓			1,000 - 5,000
Other Labourers: Processing, Manufacturing and Utilities	9619			✓			1,000 - 5,000
Other Managers: Public Administration	0414					✓	About 100
Other Medical Technologists and Technicians (Except Dental Health)	3219			✓			500 - 1,000
Other Metal Products Machine Operators	9516			✓			Less than 500
Other Performers	5232		✓				Less than 500
Other Personal Service Occupations	6484					✓	Less than 500
Other Products Machine Operators	9517				✓		Less than 500
Other Professional Engineers, n.e.c. (not elsewhere classified)	2148	✓					Less than 500
Other Professional Occupations: Health Diagnosing and Treating	3123			✓			Less than 100
Other Professional Occupations: Physical Sciences	2115				✓		Less than 500
Other Professional Occupations: Social Science, n.e.c. (not elsewhere classified)	4169				✓		Less than 500
Other Professional Occupations: Therapy and Assessment	3144			✓			500 - 1,000
Other Protective Service Occupations	6465		✓				500 - 1,000
Other Religious Occupations	4217				✓		500 - 1,000
Other Repairers and Servicers	7445			✓			1,000 - 5,000
Other Service Supervisors	6216			✓			1,000 - 5,000
Other Services Managers	0651		✓				1,000 - 5,000
Other Small Engine and Equipment Mechanics	7335			✓			About 500
Other Technical Occupations: Motion Pictures, Broadcasting and the Performing Arts	5226		✓				Less than 500
Other Technical Occupations: Therapy and Assessment	3235			✓			1,000 - 5,000
Other Trades and Related Occupations	7383		✓				500 - 1,000
Other Trades Helpers and Labourers	7612	✓					1,000 - 5,000
Other Wood Processing Machine Operators	9434				✓		500 - 1,000
Other Wood Products Assemblers and Inspectors	9493		✓				1,000 - 5,000
Outdoor Sport and Recreational Guides	6442		✓				Less than 500
Painters and Coaters, Manufacturing	9496	✓					1,000 - 5,000
Painters and Decorators	7294	✓					5,000 - 10,000
Painters, Sculptors and Other Visual Artists	5136		✓				1,000 - 5,000
Paper Converting Machine Operators	9435		✓				Less than 500
Papermaking and Coating Control Operators	9234				✓		Less than 100
Papermaking and Finishing Machine Operators	9433			✓			Less than 100
Paralegal and Related Occupations	4211		✓				1,000 - 5,000
Patternmakers: Textile, Leather and Fur Products	5245			✓			Less than 100
Payroll Clerks	1432				✓		1,000 - 5,000
Personnel and Recruitment Officers	1223		✓				1,000 - 5,000
Personnel Clerks	1442			✓			1,000 - 5,000
Pest Controllers and Fumigators	7444					✓	Less than 500
Pet Groomers and Animal Care Workers	6483			✓			1,000 - 5,000
Petroleum Engineers	2145			✓			1,000 - 5,000
Petroleum, Gas and Chemical Process Operators	9232			✓			5,000 - 10,000

*** National Occupational Classification Number**

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Projected Demand: Specific Occupational Clusters

		Projected Growth†					
Occupational Clusters	**NOC***	**Well above average**	**Above average**	**Average**	**Below average**	**Well below average**	**Number of People in this Occupational Cluster in Alberta (1999)**
Pharmacists	3131			✓			1,000 - 5,000
Photographers	5221		✓				1,000 - 5,000
Photographic and Film Processors	9474			✓			1,000 - 5,000
Physicists and Astronomers	2111					✓	Less than 500
Physiotherapists	3142			✓			1,000 - 5,000
Plasterers and Drywall Installers and Finishers and Lathers	7284	✓					1,000 - 5,000
Plastics Products Assemblers, Finishers and Inspectors	9495			✓			500 - 1,000
Plastics Processing Machine Operators	9422		✓				500 - 1,000
Plating, Metal Spraying and Related Operators	9497		✓				Less than 500
Plumbers	7251	✓					1,000 - 5,000
Police Officers (Except Commissioned)	6261			✓			1,000 - 5,000
Postal and Courier Services Managers	0132				✓		500 - 1,000
Post-Secondary Teaching and Research Assistants	4122			✓			1,000 - 5,000
Power System Electricians	7243			✓			Less than 500
Power Systems and Power Station Operators	7352			✓			Less than 500
Primary Production Managers (Except Agriculture)	0811		✓				5,000 - 10,000
Printing Machine Operators	9470					✓	500 - 1,000
Printing Press Operators	7381				✓		About 1,000
Probation and Parole Officers and Related Occupations	4155			✓			500 - 1,000
Process Control and Machine Operators, Food and Beverage Processing	9461		✓				1,000 - 5,000
Producers, Directors, Choreographers and Related Occupations	5131		✓				1,000 - 5,000
Production Clerks	1473				✓		1,000 - 5,000
Professional Occupations: Business Services to Management	1122		✓				1,000 - 5,000
Professional Occupations: Public Relations and Communications	5124		✓				1,000 - 5,000
Program Leaders and Instructors: Recreation and Sport	5254		✓				1,000 - 5,000
Program Officers Unique to Government	4168		✓				Less than 100
Property Administrators	1224				✓		1,000 - 5,000
Psychologists	4151			✓			1,000 - 5,000
Public Works and Maintenance Labourers	7621					✓	1,000 - 5,000
Public Works Maintenance Equipment Operators	7422			✓			1,000 - 5,000
Pulp Mill Machine Operators	9432			✓			Less than 500
Pulping Control Operators	9233				✓		Less than 500
Purchasing and Inventory Clerks	1474				✓		5,000 - 10,000
Purchasing Agents and Officers	1225			✓			1,000 - 5,000
Purchasing Managers	0113			✓			500 - 1,000
Pursers and Flight Attendants	6432			✓			500 - 1,000
Railway and Marine Traffic Controllers	2275					✓	Less than 500
Railway and Motor Transport Labourers	7622					✓	About 500
Railway and Yard Locomotive Engineers	7361					✓	500 - 1,000
Railway Carmen/women	7314					✓	500 - 1,000
Railway Conductors and Brakemen/women	7362					✓	500 - 1,000
Railway Track Maintenance Workers	7432					✓	500 - 1,000
Railway Yard Workers	7431					✓	Less than 500
Real Estate Agents and Salespersons	6232			✓			5,000 - 10,000

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Projected Demand: Specific Occupational Clusters

		Projected Growth†					
Occupational Clusters	**NOC***	**Well above average**	**Above average**	**Average**	**Below average**	**Well below average**	**Number of People in this Occupational Cluster in Alberta (1999)**
Receptionists and Switchboard Operators	1414			✓			10,000 or more
Records and File Clerks	1413			✓			1,000 - 5,000
Recreation and Sport Program and Service Directors	0513			✓			500 - 1,000
Recreation and Sports Program Supervisors and Consultants	4167		✓				1,000 - 5,000
Refrigeration and Air Conditioning Mechanics	7313			✓			1,000 - 5,000
Registered Nurses	3152		✓				20,000 or more
Registered Nursing Assistants	3233	✓					1,000 - 5,000
Residential and Commercial Installers and Servicers	7441			✓			1,000 - 5,000
Residential Home Builders and Renovators	0712	✓					1,000 - 5,000
Respiratory Therapists and Clinical Perfusionists	3214			✓			500 - 1,000
Restaurant and Food Service Managers	0631		✓				10,000 or more
Retail and Wholesale Buyers	6233			✓			1,000 - 5,000
Retail Salespersons and Sales Clerks	6421			✓			50,000 or more
Retail Trade Managers	0621				✓		30,000 or more
Retail Trade Supervisors	6211				✓		5,000 - 10,000
Roofers and Shinglers	7291	✓					1,000 - 5,000
Rubber Processing Machine Operators and Related Workers	9423			✓			About 500
Sales Representatives, Wholesale Trade (Non-Technical)	6411			✓			20,000 or more
Sales, Marketing and Advertising Managers	0611			✓			5,000 – 10,000
Sawmill Machine Operators	9431					✓	1,000 – 5,000
School and Guidance Counsellors	4143			✓			500 – 1,000
School Principals and Administrators of Elementary and Secondary Education	0313			✓			1,000 – 5,000
Secondary School Teachers	4141			✓			10,000 or more
Secretaries (Except Legal and Medical)	1241			✓			20,000 or more
Securities Agents, Investment Dealers and Traders	1113				✓		1,000 - 5,000
Security Guards and Related Occupations	6651		✓				5,000 - 10,000
Senior Managers: Financial, Communications Carriers and Other Business Services	0013			✓			1,000 - 5,000
Senior Managers: Goods Production, Utilities, Transportation and Construction	0016		✓				5,000 - 10,000
Senior Managers: Health, Education, Social and Community Services and Membership Organizations	0014			✓			1,000 - 5,000
Senior Government Managers and Officials	0012			✓			1,000 - 5,000
Senior Managers: Trade, Broadcasting and Other Services, n.e.c. (not elsewhere classified)	0015			✓			1,000 - 5,000
Service Station Attendants	6621				✓		1,000 - 5,000
Sewing Machine Operators	9451				✓		1,000 - 5,000
Sheet Metal Workers	7261	✓					1,000 - 5,000
Sheriffs and Bailiffs	6461		✓				Less than 500
Shippers and Receivers	1471				✓		10,000 or more
Shoe Repairers and Shoemakers	7343			✓			Less than 500
Silviculture and Forestry Workers	8422					✓	About 500
Social Workers	4152			✓			1,000 - 5,000
Specialist Physicians	3111	✓					1,000 - 5,000

*** National Occupational Classification Number**

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Projected Demand: Specific Occupational Clusters

		Projected Growth†					
Occupational Clusters	**NOC***	**Well above average**	**Above average**	**Average**	**Below average**	**Well below average**	**Number of People in this Occupational Cluster in Alberta (1999)**
Specialized Cleaners	6662			✓			5,000 - 10,000
Sports Officials and Referees	5253			✓			Less than 500
Stationary Engineers and Auxiliary Equipment Operators	7351			✓			1,000 - 5,000
Steamfitters, Pipefitters and Sprinkler System Installers	7252		✓				1,000 - 5,000
Storekeepers and Parts Clerks	1472				✓		1,000 - 5,000
Structural Metal and Platework Fabricators and Fitters	7263	✓					500 - 1,000
Support and Assisting Occupations: Motion Pictures, Broadcasting and the Performing Arts	5227		✓				Less than 500
Supervisors, Motor Transport and Other Ground Transit Operators	7222				✓		1,000 - 5,000
Supervisors, Petroleum, Gas and Chemical Processing and Utilities	9212			✓			1,000 - 5,000
Supervisors, Electrical Products Manufacturing	9223		✓				Less than 100
Supervisors, Electronics Manufacturing	9222	✓					Less than 500
Supervisors, Fabric, Fur and Leather Products Manufacturing	9225				✓		Less than 500
Supervisors, Finance and Insurance Clerks	1212				✓		1,000 - 5,000
Supervisors, Food, Beverage and Tobacco Processing	9213			✓			About 1,000
Supervisors, Forest Products Processing	9215				✓		500 - 1,000
Supervisors, Furniture and Fixtures Manufacturing	9224			✓			Less than 500
Supervisors, General Office and Administrative Support Clerks	1211			✓			1,000 - 5,000
Supervisors, Landscape and Horticulture	8256	✓					500 - 1,000
Supervisors, Library, Correspondence and Related Information Clerks	1213			✓			Less than 500
Supervisors, Logging and Forestry	8211				✓		Less than 500
Supervisors, Machinists and Related Occupations	7211			✓			500 - 1,000
Supervisors, Mail and Message Distribution Occupations	1214			✓			500 - 1,000
Supervisors, Mineral and Metal Processing	9211					✓	500 - 1,000
Supervisors, Mining and Quarrying	8221			✓			Less than 500
Supervisors, Oil and Gas Drilling and Service	8222		✓				1,000 - 5,000
Supervisors, Other Mechanical and Metal Products Manufacturing	9226			✓			1,000 - 5,000
Supervisors, Other Products Manufacturing and Assembly	9227			✓			Less than 500
Supervisors, Plastic and Rubber Products Manufacturing	9214				✓		About 500
Supervisors, Printing and Related Occupations	7218			✓			About 500
Supervisors, Railway Transport Operations	7221					✓	About 500
Supervisors, Recording, Distributing and Scheduling Occupations	1215					✓	1,000 - 5,000
Survey Interviewers and Statistical Clerks	1454		✓				1,000 - 5,000
Survey Technologists and Technicians	2254			✓			About 500
Tailors, Dressmakers, Furriers and Milliners	7342			✓			1,000 - 5,000
Taxi and Limousine Drivers and Chauffeurs	7413			✓			1,000 - 5,000
Technical Occupations Related to Museums and Galleries	5212			✓			500 - 1,000
Technical Sales Specialists, Wholesale Trade	6221		✓				About 10,000
Telecommunication Carriers Managers	0131		✓				1,000 - 5,000
Telecommunications Installation and Repair Workers	7246	✓					1,000 - 5,000
Telecommunications Line and Cable Workers	7245		✓				1,000 - 5,000
Telephone Operators	1424			✓			1,000 - 5,000
Tellers, Financial Services	1433					✓	5,000 - 10,000
Testers and Graders, Food and Beverage Processing	9465			✓			Less than 500

*** National Occupational Classification Number**

† Well above average: 4% and above. Above average: 3.3% – 3.9%. Average: 2.4% – 3.2%. Below average: 1.9% – 2.3%. Well below average: 1.8% and below.

Projected Demand: Specific Occupational Clusters

		Projected Growth†					
Occupational Clusters	**NOC***	**Well above average**	**Above average**	**Average**	**Below average**	**Well below average**	**Number of People in this Occupational Cluster in Alberta (1999)**
Textile Dyeing and Finishing Machine Operators	9443			✓			Less than 500
Textile Machinery Mechanics and Repairers	7317				✓		Less than 100
Theatre, Fashion, Exhibit and Other Creative Designers	5243		✓				500 - 1,000
Ticket and Cargo Agents and Related Clerks (Except Airline)	6434				✓		Less than 500
Tilesetters	7283	✓					500 - 1,000
Tool and Die Makers	7232			✓			Less than 500
Tour and Travel Guides	6441		✓				About 1,000
Translators, Terminologists and Interpreters	5125		✓				Less than 500
Transportation Managers	0713					✓	1,000 - 5,000
Transportation Route and Crew Schedulers	1476				✓		Less than 500
Trappers and Hunters	8442					✓	Less than 100
Travel Counsellors	6431		✓				1,000 - 5,000
Truck Drivers	7411	✓					20,000 or more
Typesetters and Related Occupations	1423					✓	500 - 1,000
Typists and Word Processing Operators	1412			✓			1,000 - 5,000
Underground Mine Service and Support Workers	8411					✓	Less than 500
Underground Production and Development Miners	8231					✓	500 - 1,000
University Professors	4121			✓			1,000 - 5,000
Upholsterers	7341			✓			500 - 1,000
Urban and Land Use Planners	2153					✓	500 - 1,000
Utilities Managers	0912				✓		About 1,000
Veterinarians	3114				✓		About 500
Visiting Homemakers, Housekeepers and Related Occupations	6471			✓			5,000 - 10,000
Water and Waste Plant Operators	9424			✓			Less than 500
Water Well Drillers	7373		✓				Less than 500
Waterworks and Gas Maintenance Workers	7442				✓		1,000 - 5,000
Weavers, Knitters and Other Fabric-Making Operators	9442			✓			Less than 500
Welders and Soldering Machine Operators	951		✓				10,000 or more
Woodworking Machine Operators	9513			✓			500 - 1,000
Writers	5121		✓				1,000 - 5,000

*** National Occupational Classification Number**

† Well above average: 4% and above. Above average: 3.3% – 3.9%. Average: 2.4% – 3.2%. Below average: 1.9% – 2.3%. Well below average: 1.8% and below.

Appendix A
Glossary of Terms

The following definitions will help clarify some of the terms used in this publication.

Baby Boom

Between 1947 and 1966 there was a significant increase in the number of babies born in Canada. It was a time of peace and prosperity following the Second World War (WWII). The large population born during those years is called the "baby boom" and dominates Canadian society. The baby boom period was followed by a "baby bust" period characterized by a relatively low number of new babies.

Canadian Occupational Projection System (COPS)

COPS is a federal-provincial initiative that projects the future job requirements of all occupations in Canada by province. The occupational projections are based on forecasts of industry growth and utilize the relationship between occupations and industries as collected by Statistics Canada during each census. In addition, the information collected by the Labour Force Survey is used to update the projections between census years.

Demographics

This is the statistical study of various features of the population such as age, education, employment, gender, fertility, etc. "Canada has… people between the ages of 34 and 55. These people are often called *baby boomers*" is a piece of demographic information. Demographics can provide some very accurate statistics that can be used to make predictions of future trends.

Economic indicator

An economic indicator is just what it sounds like, a statistic that indicates something about the economy. Economic indicators have become a standard part of business reporting. If the change is a big one, the story will be front-page news. If the story is a minor one, the statistics will still appear in the business section of most newspapers. Examples of economic indicators include the Bank of Canada rate, inflation, Gross Domestic Product (GDP) and the value of the Canadian dollar.

Employment

Employment, both full time and part time, includes any activity carried out for pay or profit, either for an employer or by a self-employed person. It also includes family unpaid work when it is a direct contribution to the operation of a farm, business, or professional practice owned or operated by a related member of the household.

Employment growth
Jobs open up for a number of reasons. One is employment growth, the creation of new jobs in a growing economy.

Exports
Exports are goods and services sold outside of the country. Alberta's economy relies on exports to make it strong. When exports drop, it can affect many other businesses such as transporters, packagers and other industries. Exports are affected by changes in the overall economy, including interest rates and the value of the Canadian dollar.

Forecast
A forecast starts with the present and projects from current information. Forecasts usually project from an existing set of conditions and those conditions are defined by the assumptions on which they are based. In other words, a forecast simplifies reality by making key assumptions. Examples of a key assumption are "if the interest rate remains at" or "if the population of Alberta remains at." A forecast is very specific and identifiable to one person or organization, and it has a short time frame.

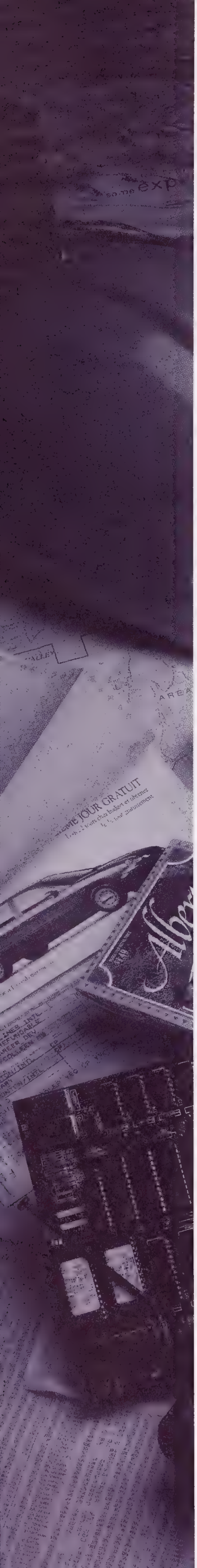
Gross Domestic Product (GDP)
This is the monetary value of all goods and services produced in a certain area over a given period of time. In Alberta, our GDP is used as a measure of economic growth. A rise in GDP indicates a rise in overall economic activity.

Industry
"Industry" is used to collectively refer to all activities in the production, marketing and distribution of goods or services: business, trade, manufacture and service. "An industry" is defined by the kind of economic activity the establishments are involved in – mining, manufacturing, etc.

Inflation
Inflation is an abnormal increase in the amount of money and credit circulating in the economy because of a general rise in prices.

Job
A job is a set of duties or tasks. A job can be paid or unpaid. It can be completed at a work site, at home, or somewhere else. It can be a contract job, or a consulting job. Even someone who is self-employed has a job.

Labour force
The labour force is the portion of the working age population (people over 15) who are employed or seeking work. Working age population does not include people who are living on Indian reserves, full-time members of the armed forces, and inmates of institutions.



National Occupational Classification (NOC)

The NOC is an occupational classification system developed by Human Resources Development Canada. This numeric classification system is used to classify approximately 7,000 occupations in Canada. It goes from very general categories to more specific and divides all types of occupations into nine different skill types and a separate grouping for management occupations. The NOC system also classifies occupations by their four skill levels that correspond to the level of education required to perform the work. Virtually every occupation in Canada can be found in the National Occupational Classification.

Occupation

An occupation is a group of jobs with similar responsibilities that require a common set of skills. For example, "computer programmer" is an occupation. Programmers may have permanent or temporary jobs working for specific employers, work on a freelance or contract basis, be self-employed, work full-time or part-time, be paid for their work or volunteer their services. They may change jobs or hold several jobs at one time, but until they change the type of duties or tasks they perform, they are still computer programmers.

Standard Industrial Classification (SIC)

The SIC is a numeric method of separating and identifying industries and collecting statistics, used by Statistics Canada. It's a large listing of industries in Canada and goes from very general categories to very specific ones. This classification system divides the industries up into 18 major divisions, 76 major groups and 360 sub-groups. Virtually every industry in the country can be found in the Standard Industrial Classification. The difference between NOC and SIC is that NOC describes occupational clusters and SIC descibes industries.

Trend

A trend is a change in social direction that is wide in scope and that has been identified by many sources. Before something can be described as a trend, there has to be a lot of evidence to support it – it has to have a long history. When you look at a trend, you can look back and see where it began and how it has affected society. An example of a trend that has influenced the Alberta labour market is the increased use of technology in the work place.

Virtual (office, company, corporation, etc.)

In the business world, this is a relatively recent term. A virtual company, corporation or office is one whose members are physically apart but they appear to be a single, unified organization with a real physical location. Members of virtual organizations usually work by computer using e-mail and other software that allows them to work together in an electronic environment. Another example is a virtual retailer such as those that operate entirely through the Internet. To the outside world, they may appear to be a real physical store. However, they are actually a collection of people, products and other resources scattered over a variety of locations. They only come together in an electronic environment, not a physical one.

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